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PRIMARY MALIGNANT TUMORS OF BONE

HENRY W. MEYERDING, M.D.
AND
JORGE E. VALLS, M.D.
Fellow in Orthopedic Surgery, the Mayo Foundation
ROCHESTER, MINN.

This study of 424 primary malignant tumors of bone encountered at the Mayo Clinic during the past quarter century (1909 to 1934) was undertaken in response to the invitation of the "Sociedad Argentina de Cirugia" to one of us to participate in a symposium. We have reviewed the records, clinical and laboratory observations, roentgenograms, pathologic characteristics, treatment and results of treatment. We have had the cooperation of the pathologists in classifying 361 (85 per cent) of the tumors in these cases and in grading the malignancy of most of them. By careful follow-up inquiry we have traced 98.3 per cent of 424 patients over a period of three years and 96.5 per cent of 371 patients for five years after examination and first treatment (table 1).

The practitioner of internal medicine rarely encounters primary malignant tumors of bone and is compelled to depend on large medical centers or on group studies for knowledge as to the value of different methods of treatment and of prognosis. Study of the literature reveals a considerable difference of opinion as to the value of methods of diagnosis, treatment and prognosis. After studying this series of cases, we feel that we are able to draw valuable conclusions.

We have divided the primary malignant tumors of bone into the following groups: (1) osteogenic sarcoma, (2) fibrosarcoma, (3) Ewing's sarcoma, (4) multiple myeloma, (5) giant cell sarcoma (malignant) and (6) malignant tumors of bone nonsurgically diagnosed as sarcomas without specification of type.

For accuracy we have separated those cases in which surgical operation permitted microscopic diagnosis from those in which the diagnosis was based on clinical and roentgenographic examinations. We appreciate that one of the principal aids in diagnosis and prognosis is the roentgenogram, for it reveals situation, size, structure, presence or absence of invasion of soft tissues and earliest evidence of metastasis. Physicians also must appreciate the value of a history carefully taken with regard to pain, rapidity of growth, duration of symptoms, trauma, pathologic fracture and previous treatment. However, clinical and roentgenologic diagnoses at times are dangerous, particularly if the fate of an extremity depends on such data. It is our practice to apply a tourniquet whenever possible and to remove a small piece of tissue for microscopic corroboration of the clinical and roentgenologic diagnoses before carrying out radical surgical measures.

From the Section on Orthopedic Surgery, the Mayo Clinic.

OSTEOGENIC SARCOMA

An osteogenic sarcoma is a malignant tumor which develops from tissue that is predestined to form bone-producing cells. Among the osteogenic sarcomas we include osteosarcomas, chondrosarcomas, osteochondrosarcomas, osteochondrofibrosarcomas and osteochondrofibromyxosarcomas. The foregoing denote the type of tissue that is predominant in the tumor. The terms "osteolytic," "sclerosing" and "medullary" have been largely discarded lately except to emphasize anatomic or roentgenographic features. However, the terms "periosteal fibrosarcoma" and "periosteal osteogenic sarcoma" still are employed to denote tumors which continue to be recognized. Periosteal fibrosarcomas probably arise from the outer portion of the periosteum or neighboring tissue. They may cause absorption of bone or later invasion, and these processes may give rise to the supposition that the growth is a primary tumor of bone. Periosteal osteogenic sarcoma apparently arises from the corticoperiosteal tissue and produces true bone.

In the study of osteogenic sarcoma it became obvious that such tumors are rare; the incidence was about 1 (0.00025 per cent) in every 4,000 patients who entered the clinic. In the period of twenty-five years covered, there were 216 cases of osteogenic sarcoma (table 2); this comprises 50.9 per cent of the total number of cases of primary malignant tumor of bone. In 187 cases tissue was available for microscopic verification at the time of the original diagnosis, and in the remaining 29 diagnosis was based on clinical and roentgenologic observations. There were one hundred and forty-six (67.6 per cent) males and 70 (32.4 per cent) females. The average age of the 216 patients was 29.3 years. The largest number of patients, about 40 per cent, were between the ages of 10 and 20, and 132, more than 50 per cent, were less than 30; the youngest patient was 3 years and the oldest 77 years.

In 96 (44.4 per cent) of the 216 cases there was a history of trauma as a possible factor, in 46 (21.3 per cent) trauma was denied and in 74 (34.3 per cent) there was no statement in the records as to whether trauma had occurred. The average duration of symptoms before the patients came to the clinic was ten and one-third months.

Seventy-five (34.7 per cent) of these 216 tumors occurred in the femur, 38 (17.6 per cent) in the tibia and 20 (9.3 per cent) in the ilium. In 154 cases (71.3 per cent) the tumor was in the extremities; in 48 (22.2 per cent) it appeared in the region of the knee joint. There were 12 cases of pathologic fracture, in 6 of which the humerus was concerned, in 3, the tibia

and in 1 each the femur, fibula and ilium. The tumors in the 187 surgical cases mentioned previously were reexamined histologically, and whenever possible the grade of malignancy was determined according to the method of Broders (table 3).

TABLE 1.—*Primary Malignant Tumor of Bone: Three and Five Year Survival Rate According to Type of Tumor*

Tumor	Patients Treated *	Patients Traced	Lived Three or More Years After Treatment: Patients	Lived Three or More Years After Treatment: Percentage of Traced Patients	Patients Treated *	Patients Traced	Lived Five or More Years After Treatment: Patients	Lived Five or More Years After Treatment: Percentage of Traced Patients
Osteogenic sarcoma...	216	212	66	31.1	191	182	37	20.3
Fibrosarcoma..... ...	38	38	13	34.2	36	36	11	30.5
Ewing's sarcoma.....	114	113	32	28.3	100	99	21	21.2
Multiple myeloma.....	41	39	3	7.7	31	28	1	3.6
Malignant giant cell sarcoma	7	7	6	85.7	6	6	5	83.3
Nonsurgical diagnosis of "sarcoma"	8	8	3	37.5	7	7	1	14.3
Total.....	424	417 (98.3%)	123	29.5	371	358 (96.5%)	76	21.2

* Inquiry as of 1938. The three year group comprises the patients treated three or more years prior to the time of inquiry, i. e., 1934 or earlier; the five year group comprises those treated in 1932 or earlier.

TREATMENT OF OSTEOGENIC SARCOMA

The method of treatment employed was not always the method of choice, because patients and relatives failed to follow the advice given and preferred to have the less mutilating procedures carried out. Estimation of the comparative value of the different methods of treatment constitutes one of the greatest problems of today. Our methods of treatment were (1) irradiation, (2) biopsy alone or combined with irradiation and sometimes with the use of Coley's toxins and (3) excision and amputation, with or without irradiation or administration of Coley's toxins. Not all osteogenic sarcomas are operable. The site, size and grade of malignancy of the tumor, the general condition of the patient and the presence or absence of pulmonary metastasis must be taken into consideration in determining the therapeutic measures best suited to dealing with the growth.

Expectancy of life and results of treatment are actually influenced by the grade of malignancy. Of the 187 cases in which tissue was available for microscopic verification at the time of the original diagnosis, in 120 (64 per cent) the malignancy of the tumors was graded. The five year survival rates are given in table 2. The larger survival rate in the presence of a tumor with malignancy of low grade agrees well with all studies made at the clinic concerning the significance, with respect to survival, of grading of malignancy in cases of malignant conditions of other tissues. It is justifiable to feel confident of the soundness of the general conclusion that in the presence of tumors of low grade of malignancy prognosis for five year survival is considerably better than it is in the presence of tumors of higher grades, even if the more conservative surgical measures are employed in treatment of the tumors of low grade.

Radium or Roentgen Therapy Without Biopsy.—Since 1920 the use of radiotherapy in selected cases has increased. The tendency has been to use multiple converging beams, the quality varying according to the mass of tissue in which the tumor is situated. Preoperative irradiation, as now understood, has not been tried at the clinic; its field of usefulness is limited, and its indiscriminate use may be more harmful than beneficial. What is needed is early diagnosis, destruction or removal of the tumor and prevention of metastasis. Preoperative irradiation, since it consumes time, may permit metastasis. By force of circumstances, treatment has been almost entirely postoperative, some patients receiving part of their treatment at the clinic and part at home. No one but a radiologist who has had special experience in the treatment of these tumors should undertake to use radium or roentgen rays in these cases. By placing treatment in such hands, the danger of untoward results is diminished.

Of the 29 patients concerning whom diagnosis was made from clinical and roentgenologic examinations 28 received irradiation or irradiation and Coley's toxins combined; no surgical treatment was employed. Of these we have traced 27, and of the latter number only 2 (7.4 per cent) lived more than three years and none survived five years. Approximately two thirds of these patients died of metastasis in less than one year.

Coley's Toxins.—Of the 187 patients of whose tissues microscopic examination was available at the time of the original diagnosis, 184 were traced. Of these 184 traced patients some received Coley's toxins, and 40 per cent who did receive this treatment survived three years. Among those patients who did not receive Coley's toxins, 34 per cent survived three years. The five year survival rate among those patients who received Coley's toxins was 26 per cent, whereas that based on the patients who did not receive this treatment was 23 per cent. Although there is a slight advantage in survival in favor of the patients who received Coley's toxins, it is difficult to evaluate the significance of this advantage. In the first place, only 25 patients received this treatment. Also, the treatment was carried out by their local physicians and we depended on their reports as to its administration. Moreover, the treatment as respects irradiation and surgical measures was not uniform in this group.

TABLE 2.—*Osteogenic Sarcoma: Three and Five Year Survival Rate According to Type of Treatment and Histologic Grade of Malignancy*

Treatment or Grade	Patients Treated *	Patients Traced	Lived Three or More Years After Treatment: Patients	Lived Three or More Years After Treatment: Percentage of Traced Patients	Patients Treated *	Patients Traced	Lived Five or More Years After Treatment: Patients	Lived Five or More Years After Treatment: Percentage of Traced Patients
Total group.....	216	212	66	31.1	191	182	37	20.3
Amputation.....	89	88	30	34.1	78	77	19	24.7
Excision.....	56	55	28	50.9	49	44	15	34.1
Irradiation †.....	66	64	8	12.5	59	56	3	5.4
No treatment.....	5	5	0	0	5	5	0	0
Surgical cases, graded								
Grades 1 and 2.....	56	56	24	42.8	45	43	11	25.6
Grades 3 and 4.....	64	63	12	19.0	55	54	8	14.8

* Inquiry as of 1938. The three year group comprises the patients treated three or more years prior to the time of inquiry, i. e., 1934 or earlier; the five year group comprises those treated in 1932 or earlier.
† With or without biopsy.

Biopsy.—On four patients biopsy alone was performed. In 2 of these the tumor was in the bony pelvis and the patients died seven and eighteen months after the specimen was taken. One patient had a tumor of a rib and died one month after biopsy; the tumor of 1 was in the upper part of the humerus and the patient died five months after excision of the specimen.

Biopsy is of value if there is any question as to benignancy or malignancy of a lesion of bone; it is of value, also, in making possible the grading of a malignant lesion. The experience of the pathologist is directly related to the value of biopsy. The surgeon must be certain that the material he submits to the pathologist is true tumorous tissue, and if the histologic diagnosis is not in agreement with his clinical opinion more tissue should be examined. As a rule the open operation is preferred in performing biopsy, for it permits inspection of the tumor and allows sufficient tissue to be obtained from a typical portion of the tumor. The tourniquet is employed whenever possible and every care is taken to minimize trauma to tissue. Taking of material for biopsy by means of a needle is useful if tumors are vascular and difficult of approach; some osteogenic sarcomas make such a procedure difficult. Biopsy and cooperation of a skilled pathologist are of inestimable value in clearing up the question of diagnosis; furthermore, grading of the degree of malignancy may alter the decision as to the type of treatment to be employed and as to prognosis.

TABLE 3.—*Osteogenic Sarcoma: Operations by Grade of Malignancy*

		Biopsy *		Excision †		Amputation	
Grade	Total	Number	Percentage	Number	Percentage	Number	Percentage
1	17	2	11.8	15	88.2	0	0
2	39	13	33.3	9	23.1	17	43.6
3	39	9	23.1	5	12.8	25	64.1
4	25	6	24.0	5	20.0	14	56.0
Not graded	67	12	17.9	22	32.8	33	49.3
Total..	187	42*	22.5	56†	29.9	89	47.6

* Thirty-three patients received irradiation also; 5 received irradiation plus Coley's toxins.
† Forty-four patients received irradiation also; 2 received irradiation plus Coley's toxins.

Radium and Roentgen Therapy Following Biopsy.—The percentage of five year cures among traced patients who were treated by radiation after biopsy was 9.1 All such treatment was not carried out at the clinic, for it was necessary to cooperate with roentgenologists near the homes of some of the patients. Irradiation was employed because it was selected by the patient in preference to surgical treatment or because the size or situation of the tumor made its removal impossible. Regression of the growth and temporary improvement were noted in some cases, whereas atrophy of bone and soft tissue and stiffness of joints occurred in others. With further knowledge and development of irradiation, improved results may make it the method of choice, but our experience to date has indicated that osteogenic sarcoma is inadequately responsive to this form of treatment.

Excision.—Osteogenic sarcomas were excised in a great number of cases when the degree of malignancy was low, when the tumors were of such size and were so situated as to make amputation impossible or when the patient refused to have more radical procedures carried out. When excision is performed in the early stages of the disease and the degree of malignancy is low, expectancy of life is increased and a functioning extremity may be preserved. Recurrence takes place, however, in spite of postoperative irradiation and treatment with Coley's toxins, and late amputation may be contraindicated because of metastasis. Complete excision of bone, followed by adequate irradiation, may result in extensive scarring; then reconstructive surgical treatment, such as bone grafting, may result in formation of ulcer, loss of the graft and, finally, amputation. Of the 44 patients treated by excision, with or without irradiation or administration of Coley's toxins, 15 (34.1 per cent) lived five years or more (table 2).

Amputation.—Consent to amputation is given by the patient or responsible relative only when the more conservative measures have failed or when the condition has become unbearable as a result of pain, disfigurement or disability. Thus, amputation often is of a palliative nature, permitting the patient a period of relief from symptoms during which time there is a temporary gain in weight and improvement of morale. Postoperative irradiation, as well as administration of Coley's toxins, is employed in the hope of destroying unrecognized metastatic growths. Although a considerable fraction of the patients who came to amputation had undergone previous conservative surgical treatment or surgical treatment combined with irradiation and administration of Coley's toxins, instead of early amputation, the five year survival rate after amputation at the clinic was 24.7 per cent (table 2).

The site of amputation should be well away from the tumor. Patients frequently insist on saving length of limb and thus risk the possibility of local recurrence. Amputation above the knee should be performed if the tumor is about the ankle and through the upper part of the femur if the tumor is about the knee joint. If a tumor is in the region of the elbow, high humeral amputation or disarticulation at the shoulder usually is preferred. The choice of operation is, as we already have emphasized, in relation to the degree of malignancy. In our series, when the malignant condition was of grade 1 amputation never was employed (table 3).

COMMENT CONCERNING OSTEOGENIC SARCOMA

In treating osteogenic sarcoma, surgical operation constitutes the method of choice. Osteogenic sarcomas as a group are highly resistant to irradiation; therefore we have not much hope of permanent benefit from this type of treatment; excision and amputation appear to be more reliable. When patients do not consent to operation, or when a tumor is inoperable, irradiation may be used to delay growth.

The five year survival rate of those patients who were treated surgically and were traced during five years was 23.4 per cent. There was no five year survival among those patients on whom nonsurgical treatment was employed. In combining surgical and medical treatment, and taking the total group, the five year survival rate was 20.3 per cent (table 2).

FIBROSARCOMA

Fibrosarcoma is a rare tumor which occurred in 38 (9 per cent) of the 424 primary malignant conditions of bone that we were studying. The same faculty called "osteogenic" in relation to osteogenic sarcoma of bone-forming cells may here be called "fibrogenic." Thus a fibrosarcoma is a malignant tumor in which the characteristic feature is the formation of fiber. In our

recent experience we learned that in many instances it is difficult, and sometimes impossible, to state whether a fibrosarcoma originates from bone. Facing this problem we decided to include in this group all the cases of fibrosarcoma in which primary involvement of bone was suspected on the basis of roentgenologic and, when possible, histologic examination. As in the other groups, males were more frequently attacked than females. Of the 38 patients, 23 (60.5 per cent) were males and 15 (39.5 per cent) were females. None was less than the age of 10 years, but 23 (60.5 per cent) were less than 30. The youngest was a boy aged 10 years, the oldest was a woman aged 62, and the average age of the 38 patients was 29.6 years. The femur was involved in 13 cases (34.3 per cent) and the tibia in 6 (15.8 per cent). The tumor was in the extremities in 27 cases (71 per cent) and around the knee joint in 19 (50 per cent). Trauma was a possible factor in 15 cases (39.5 per cent); it was not a possible factor in 5 (13.1 per cent), and concerning the remainder (47.4 per cent) there was no statement as to whether trauma had occurred. Two pathologic fractures, one in the humerus and one in the ulna, were found.

TABLE 4.—*Fibrosarcoma: Three and Five Year Survival Rate According to Type of Treatment and Histologic Grade of Malignancy*

Group	Patients Treated *	Patients Traced	Lived Three or More Years After Treatment		Patients Treated *	Patients Traced	Lived Five or More Years After Treatment	
			Patients	Percentage of Traced Patients			Patients	Percentage of Traced Patients
Total group	38	38	13	34.2	36	36	11	30.5
Amputation	22	22	10	45.4	20	20	8	40.0
Excision	8	8	2	25.0	8	8	2	25.0
Irradiation	6	6	1	16.7	6	6	1	16.7
No treatment †	2	2	0	0	2	2	0	0
Surgical cases, graded								
Grades 1 and 2	11	11	3	27.3	11	11	3	27.3
Grades 3 and 4	17	17	5	29.4	15	15	4	26.7

* Inquiry as of 1938. The three year group comprises the patients treated three or more years prior to the time of inquiry, i. e., 1934 or earlier; the five year group comprises those treated in 1932 or earlier.
† Biopsy only.

Tissue was available for microscopic examination in all 38 cases. Of these, in 28 (73.7 per cent) the malignancy of the tumor was graded according to the method of Broders. Of these 28 cases, in 11 (39.3 per cent) the tumor was classified as of grade 1 or 2 and in 17 (60.7 per cent) as of grade 3 or 4 (table 4).

Of the 38 cases, in 2 (5.2 per cent) only biopsy was performed, the patients returning home after the diagnosis. In 6 (15.8 per cent) biopsy was followed by irradiation. Excision combined with irradiation was employed in 8 cases (21.1 per cent). Amputation was performed in 22 cases (57.9 per cent); of these, in 4 only amputation was performed; in 1 amputation was combined with administration of Coley's toxins, and in 17 amputation and irradiation were employed, combined in 2 cases with administration of Coley's toxins.

The type of treatment employed was modified according to the patient's or relative's wishes; some refused radical surgical measures. Furthermore, treatment was modified by the situation and size of the tumor and by the presence or absence of metastasis. Our advice, usually, in the presence of high grades of malignancy in tumors was amputation whenever possible. Thus, thirteen (59.1 per cent) of the amputations were performed for tumors of grade 3 or 4, four (18.2 per cent) for tumors of grade 1 or 2 and five (22.7 per cent) for tumors which were not graded. Of the excisions employed, five (62.5 per cent) were for tumors of grade 1 or 2; 3 of these tumors (37.5 per cent) were not graded. Excision was not performed for tumors of grade 3 or 4.

Of the traced patients treated with irradiation (table 4), 16.7 per cent survived five years or more. Of patients treated by excision together with irradiation, 25 per cent of the traced patients survived five or more years whereas of those treated by amputation, with or without irradiation, 40 per cent of the traced patients lived five years or more. Thus the results of radical surgical operation in combination with postoperative irradiation appear to give the better results and the highest number of survivals for five years. It is also to be noted that amputation was performed in those cases in which the grade of malignancy was highest. Of 38 patients who had fibrosarcomas of bone, 13 (34.2 per cent) lived three or more years. Of 36 patients treated in 1932 or earlier, 11 (30.5 per cent) lived five or more years.

Comment.—Our experience leads us to believe that the fibrosarcomas which occur in bone are more amenable to surgical treatment than are osteogenic tumors, and the method of choice, whenever possible, should be biopsy performed under control with a tourniquet and immediate amputation. If this is not possible, radical excision followed by irradiation is to be carried out. Our experience with Coley's toxins in this group of cases was limited, and therefore it is impossible to draw conclusions concerning its value.

EWING'S TUMOR

Increasingly important tumors of bone often confused, clinically and roentgenologically, with osteomyelitis and giving such characteristic response to irradiation as to permit of diagnostic irradiation are those known as Ewing tumors. In 1922, Ewing classified endothelioma of bone as (1) multiple endothelioma, (2) angioendothelioma and (3) solitary diffuse endothelioma. This endothelioma of bone is now widely accepted as an entity, but there is much doubt about its cell structure and origin. Broders has expressed the belief that the tendency of the tumor toward differentiation into blood spaces and sinusoids is suggestive of vascular origin, and he has designated the growth by the term "hemangioendothelioma." This tumor usually occurs near the middle of the shaft of a long bone, in a bone of the pelvis or in the scapula. The growth in long bones usually begins in the medullary cavity and spreads until a large segment of the shaft is involved. As the tumor grows the cancellous bone is absorbed; the shaft becomes honeycombed; when the periosteum is reached the defensive reaction forms layers of new bone and an "onion skin" formation takes place; later, with further growth, the tumor bursts through to infiltrate the soft parts. Metastasis to the regional lymph nodes and lungs may take place early; later other bones, the brain or the viscera may be involved. Endotheliomas are purely osteolytic tumors, and any formation of bone that takes place is laid down by periosteal reaction. Tumor cells have no part in the formation other than that of stimulating the periosteum.

The clinical signs of Ewing tumors are insidious onset, with vague, fleeting, aching pains which occur intermittently and usually are more severe at night than by day. During this period rheumatism usually is suspected. Pain may disappear for days or even months, only to recur with increasing frequency and severity. Tumefaction may be discovered, or pathologic fracture perhaps occurs. Chills and fever are accompanied by a temperature as high as 102 F., also by local warmth and tenderness and even fluctuation. The erroneous diagnosis of osteomyelitis may be made. Remissions may continue and the temperature becomes normal. Leukocytosis, which also is frequent, may disappear with decreasing size of the tumor. As the disease advances, pain becomes constant and severe; the limb becomes enlarged; the temperature may increase to 103 F.; anemia and cachexia develop, and rapidly fatal pneumonia, because of pulmonary metastasis, ensues.

The roentgenologic characteristic of Ewing's tumor is usually diffuse involvement of the shaft. The bone becomes widened, by the effect on both cortex and medulla, and may assume a moth-eaten appearance with the laminated onion skin feature visible in the periosteal region. Although the laminated appearance commonly is seen and is important, it is not pathognomonic; we encountered it in other conditions, such as osteomyelitis and osteogenic sarcoma.

Of the 114 patients in this series who had Ewing sarcomas, 82 (71.9 per cent) were males and 32 (28.1 per cent) females. Ewing's tumor occurs more frequently in the young than in the old. In our series 76 (66.8 per cent) of the patients were less than 30. The youngest was a girl aged 17 months and the oldest a man aged 70.

Seventy (61.4 per cent) of these tumors occurred in the extremities. Of the 114, 28 (24.6 per cent) were in the region of the knee joint. The bone most frequently affected was the femur; this bone was involved in 30 (26.3 per cent) of the cases. A positive history of trauma was given in 40 cases (35.1 per cent); a negative history was given in 21 (18.4 per cent), and in 53 (46.5 per cent) whether trauma was a factor was not stated. Pathologic fractures occurred in 18 (15.8 per cent) of the cases. Of these, eleven occurred in the femur, three in the humerus, two in the clavicle, one in the tibia and one in a rib.

Because this study includes patients treated before 1920, when systematic radiotherapy for tumors was not, to all intents, used at the clinic and, further, because this tumor was not commonly recognized until 1922, many of the patients were treated surgically. Since then increasing reliance has been placed on the radiotherapeutic test and on treatment by irradiation. In irradiation, the use of multiple converging beams has become the method of choice. This is an elaboration of the principle of cross fire, whereby four, six, eight or more beams of roentgen rays are made to converge on the neoplasm from different angles.

Of the 114 cases, in 100 (87.7 per cent) microscopic verification of the clinical diagnosis was possible. In 14 (12.3 per cent) operation was not carried out and diagnosis was based on clinical and roentgenologic examinations.

In 14 (12.3 per cent) of the 114 cases irradiation was employed, and in one of these 14 cases Coley's toxins were used in addition. In 8 cases (7 per cent) biopsy alone was performed, the patients returning home after diagnosis was made. In 43 cases (37.7 per cent) biopsy was followed by irradiation, and in 9 of these 43 cases, Coley's toxins were used in addition. Excision was performed in 15 cases (13.2 per cent), and in 14 of these irradiation was given postoperatively and in 1 Coley's toxins. Amputation was performed in 34 cases (29.8 per cent), and in 14 of these amputation alone or amputation and Coley's toxins were employed. In 17 of these 34 cases both amputation and irradiation were employed and in 3 amputation, irradiation and Coley's toxins.

Of the patients traced over a period of five years after treatment with roentgen rays 37.5 per cent were living. Of those patients from whom only a specimen for biopsy was taken and who were traced for five years none was living. Of traced patients subjected to biopsy and irradiation, 20.5 per cent survived five years or more. Excision together with irradiation or use of Coley's toxins, or all combined, gave survival for five years of 16.7 per cent of patients who received such treatment. Amputation, alone or combined with irradiation or use of Coley's toxins or combined with both of these adjunct measures, was followed by survival for five years of 24.2 per cent of traced patients. Among the 114 patients treated and traced, 21.2 per cent survived five years (table 5).

TABLE 5.—*Ewing's Tumor: Three and Five Year Survivals According to Type of Treatment and Grade of Malignancy*

Group	Patients Treated *	Patients Traced	Lived Three or More Years After Treatment: Patients	Lived Three or More Years After Treatment: Percentage of Traced Patients	Patients Treated *	Patients Traced	Lived Five or More Years After Treatment: Patients	Lived Five or More Years After Treatment: Percentage of Traced Patients
Total group.....	114	113	32	28.3	100	99	21	21.2
Amputation.....	34	34	11	32.3	33	33	8	24.2
Excision.....	15	14	3	21.4	13	12	2	16.7
Irradiation †.....	57	57	18	31.6	47	47	11	23.4
No treatment ‡....	8	8	0	0	7	7	0	0
Surgical cases, graded								
Grades 1 and 2.....	16	16	4	25.0	16	16	3	18.7
Grades 3 and 4.....	57	57	9	15.8	52	52	8	15.4

* Inquiry as of 1938. The three year group comprises the patients treated three or more years prior to the time of inquiry, i. e., 1934 or earlier; the five year group comprises those treated in 1932 or earlier.
† With or without biopsy.
‡ Biopsy only.

Comment.—In some instances, even though intense involvement, destruction of joints, pathologic fracture, previous operations or infection obscured the nature of the lesion, biopsy or surgical operation seemed necessary and justifiable. Adequate irradiation frequently will cause early tumors to disappear and the bone to assume a normal appearance. The physician should bear in mind that clinically and roentgenologically, and sometimes surgically, this tumor may simulate inflammation and as a result the diagnosis may be osteomyelitis. As experience increases one recognizes the increasing importance of irradiation as a diagnostic and therapeutic agent.

MULTIPLE MYELOMA

The clinical picture of multiple myeloma is vague. Rheumatic pain, neuritic pain or what appears to be neurotic pain, with or without fever, are early symptoms. Later the weakness, loss of weight and anemia suggest a malignant condition. There may be spinal deformity, referred pain and a history of pathologic frac-

ture. Large quantities of protein have been found in the urine in a large percentage of cases; therefore examination for Bence Jones protein should be performed routinely. Symptoms are intermittent, and periods of recession may occur. Careful examination of the spinal columns of elderly patients who have unexplained abdominal pain is essential, as multiple myeloma may be the cause. Soft, tender masses in the sternum, ribs and clavicle are not uncommon.

With further involvement, progressive anemia and exhaustion appear, and weight is lost. A large number of the patients have passed 40 years of age. Roentgenologic examinations of the spinal column, thorax and skull in suspected cases may give evidence of multiple regions of destruction. When multiple myeloma occurs in the skull it appears to be punched out and has a well defined margin. A distinctive feature of these tumors, from the roentgenologic standpoint, is that they usually are multiple and occur simultaneously in the bone marrow, especially of the spinal column, sternum, ribs, skull and clavicles.

Strain, such as heavy lifting, may result in crushing or fracture of the involved bone. The tumor may be so extensive as to make differential diagnosis difficult; thus surgical measures may be needed for diagnosis.

In our series, 41 (9.7 per cent) of the primary malignant growths of bone were multiple myelomas (table 6). Thirty-one (75.6 per cent) of the patients were males; 10 (24.4 per cent) were females. These tumors occurred most commonly after patients had passed the age of 40. Thirty (73.2 per cent) occurred when the patients were between the ages of 40 and 70. The youngest patient was a boy aged 4 years and the oldest, a man aged 70. At the time of examination multiple lesions were found in 21 cases (51.2 per cent). In some instances the tumor was not recognized as consisting of multiple lesions, but surgical operation was necessary and its true character became evident on microscopic examination. Subsequent examinations also proved, in other cases, the multiple character of what originally was thought to be a single lesion. A history of trauma was obtained in 13 (31.7 per cent) of the cases; in 5 (12.2 per cent) there was no history of trauma, and in 23 (56.1 per cent) there was no statement relative to trauma.

Pathologic fractures were found in 8 (19.5 per cent) of the cases. In 4 cases (9.7 per cent) biopsy alone was performed to clear up the diagnosis. In 29 (70.7 per cent) treatment was by irradiation. In 4 cases excision of the primary tumor was followed by irradiation, and in 4 amputation was advisable.

Of the patients treated and traced for five years, only 1 (3.6 per cent) survived.

Comment.—Males were afflicted three times more often than females. Almost three fourths of the tumors occurred after the patient had passed the age of 40; more than half were recognized as multiple at the time of the original diagnosis. Treatment proved of little avail.

GIANT CELL SARCOMA (MALIGNANT)

Malignant giant cell sarcoma has been, in our experience, an extremely rare condition (table 6); it accounted for only 7 (1.6 per cent) of the primary malignant growths of bone. Of the patients 3 were males and 4 females; all were between the ages of 10 and 40. The femur was involved in 3 cases and the tibia, fibula, sacrum and ulna each in 1 case. In 1 case biopsy was performed; in 1 excision was followed by irradiation, and in 5 amputation was followed by irradiation. Of the patients traced for five years or more after treatment, 83.3 per cent had survived.

These malignant giant cell tumors are recognizable as such only on microscopic study. The tissue in our cases was studied by Dr. Broders, who corroborated the original diagnosis.

TABLE 6.—*Primary Malignant Tumors of Bone: Type of Treatment of Each Type of Tumor*

Type of Treatment	Osteogenic Sarcoma		Ewing's Sarcoma		Fibrosarcoma		Multiple Myeloma		Malignant Giant Cell Sarcoma		Nonsurgical Diagnosis of Sarcoma		Total	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
	216	100	114	100	38	100	41	100	7	100	8	100	424	100
Amputation*	89	41.2	34	29.8	22	57.9	4	9.7	5	71.4	0	0	154	36.4
Excision*....	56	25.9	15	13.2	8	21.1	4	9.7	1	14.3	0	0	84	19.8
Irradiation†.	66	30.6	57	50.0	6	15.8	29	70.7	0	0	8	100	166	39.1
No treatment ‡	5	2.3	8	7.0	2	5.2	4	9.7	1	14.3	0	0	20	4.7

* With or without irradiation. † With or without biopsy. ‡ Biopsy alone.

COMMENT ON THE ENTIRE SERIES

Of the total number of primary malignant tumors of bone encountered at the Mayo Clinic from 1909 through 1934, 216 (50.9 per cent) were osteogenic sarcoma, 114 (26.9 per cent) were Ewing sarcoma, 38 (9 per cent) were fibrosarcomas, 41 (9.7 per cent) were multiple myelomas and 7 (1.6 per cent) were giant cell sarcomas (malignant), and there remained 8 (1.9 per cent) concerning which a nonsurgical diagnosis of sarcoma was made (table 6). More than two thirds of the patients, 291 (68.6 per cent), were males and 133 (31.4 per cent) were females.

TABLE 7.—*Primary Malignant Tumors of Bone: Three and Five Year Survival Rate According to Type of Treatment*

Treatment	Patients Treated *	Patients Traced	Lived Three or More Years After Treatment: Patients	Lived Three or More Years After Treatment: Percentage of Traced Patients	Patients Treated *	Patients Traced	Lived Five or More Years After Treatment: Patients	Lived Five or More Years After Treatment: Percentage of Traced Patients
Surgical.....	361	356	109	30.6	325	314	72	22.9
Nonsurgical.....	63	61	14	22.9	46	44	4	9.1
Total.....	424	417	123	29.5	371	358	76	21.2

* Inquiry as of 1938. The three year group comprises the patients treated three or more years prior to the time of inquiry, i. e., 1934 or earlier; the five year group comprises those treated in 1932 or earlier.

Twenty-four (5.7 per cent) of the patients were less than 10 years of age. Considered by decades of life, the largest percentage of patients were of the decade 10 to 19 years, namely 133 (31.4 per cent). In the decade 20 to 29 there were 92 patients (21.7 per cent). Thus, 249 (58.8 per cent) of the patients were less than 30, and more than half of the tumors occurred when the patients were in the early years of life.

The femur, which was the bone most commonly affected, was the site of the tumor in 124 cases (29.3 per cent); next in order was the tibia, represented by 60 cases (14.2 per cent). Of the total of 424 tumors, 266 (62.8 per cent) were in the extremities.

Of the 40 cases in which there were pathologic fractures, the bones most commonly attacked were the femur and humerus; each was the site of the tumor in 13 cases (32.5 per cent). The highest percentage of pathologic fractures occurred in association with multiple myelomas (19.5 per cent). In association with Ewing's sarcoma the incidence of pathologic fracture was 15.8 per cent, with osteogenic sarcoma 5.5 per cent and with fibrosarcoma 5.3 per cent. Pathologic fractures were not encountered in association with giant cell sarcoma (malignant) or in those cases in which a nonsurgical diagnosis of sarcoma was made. The tendency of multiple myeloma and Ewing's sarcoma to appear in the shafts of long bones and the osteolytic characteristics of these tumors, by lessening the strength of the bone, probably account for the occurrence of pathologic fracture in association with them. Osteogenic sarcomas frequently appear in the ends of the bones, and this, together with the increased formation of bone that accompanies development of the tumor, renders the bone unlikely to fracture. The treatment of pathologic fracture, unless amputation is performed, is fixation and irradiation.

Although we do not believe that trauma is the etiologic factor in primary malignant tumors of bone, our records contained a positive history of trauma in 40.6 per cent of the cases and a negative history in 18.4 per cent, and in the remaining 41 per cent there was no statement concerning trauma. We appreciate the medicolegal significance of trauma, for often trauma is associated by patients with the appearance of a tumor.

The type of treatment employed in the 424 cases can be roughly given as follows: In slightly more than a third of the cases amputation was performed; in about a fifth, excision; after these radical surgical procedures irradiation, together with or without the administration of Coley's toxins, was carried out. In a fourth of the cases biopsy and irradiation were employed; in the majority of the remainder of the cases treatment was by irradiation only. More details are given in table 6.

Of those patients who had primary malignant tumors of bone and who were traced for five years after the first treatment, 22.9 per cent of those who received surgical treatment had survived; of those whose diagnosis and treatment was carried on without surgical measures, 9.1 per cent had survived. Of all patients traced five years, 21.2 per cent had survived (table 7).

GENERAL IMPRESSIONS

It is obvious, from long experience, that roentgenologic treatment of tumors of bone is not a cure. Yet, such treatment has an important field of usefulness. Roentgen rays are invaluable in diagnosis, prognosis and treatment of certain types of tumors, especially Ewing tumors, and furnishes the earliest knowledge of the presence of pulmonary metastasis. The possibilities of irradiation, we believe, have not been exhausted, and with the passage of time its application will be improved and its therapeutic value increased.

We are firmly convinced that surgical operation offers the best method of treatment for the majority of primary malignant tumors of bone.

We urge surgeons, roentgenologists and pathologists to cooperate, for only through their combined efforts will diagnosis, prognosis and therapeutic measures be improved. Equally important is education of the practitioner of internal medicine in recognizing the presence of these malignant tumors and in seeking immediate consultation with those experienced and qualified to give advice. Only through early diagnosis, efficient early treatment and careful follow-up investigation can more extremities and lives be saved than have been saved in the past.

THE CONFUSING MULTIPLICITY OF SEROLOGIC TESTS FOR SYPHILIS

STANDARDIZATION OF THE SEROLOGIC REPORT AS A POSSIBLE SOLUTION

JOSEPH EARLE MOORE, M.D.
AND
HARRY EAGLE, M.D.
BALTIMORE

Six years ago the U. S. Public Health Service and the American Society of Clinical Pathologists sponsored the first of a series of serologic conferences.[1] Invited to participate in the original conference were thirteen of the country's leading serologists, most of whom had developed one or more complement fixation or flocculation procedures, identified in each case by the name of its proponent. Duplicate samples of several hundred specimens of known syphilitic and nonsyphilitic donors were submitted to each serologist, to be tested by his procedure, and data were thus obtained with respect to the sensitivity and specificity of these technics under ideal conditions.

It was hoped that as a result of this conference the excessive number of technics previously in use might be reduced to a few standard procedures suitable for general adoption and the long-sought standardization of serologic tests thereby furthered. Unfortunately for this hope, not a few but many technics were found to give satisfactory results, and the group of tests appearing in table 1 were given tacit approval by the committee charged with the evaluation of the results.

The laboratories in which these tests were developed were designated as control laboratories and in the five succeeding years were used as yardsticks against which the performance of state health department laboratories and indirectly of municipal and private laboratories as well could be conveniently measured. Each year, duplicate specimens of known syphilitic and nonsyphilitic donors have been sent to the participating state health department laboratories, and the results have been checked by comparison with those obtained in the

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From the Syphilis Division of the Johns Hopkins University School of Medicine, Baltimore, and the United States Public Health Service, Washington, D. C.

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several control laboratories.[2] Well considered criteria of approval have been set up; viz., at least 99 per cent specificity (not more than 1 per cent false positive and doubtful results in a group of known nonsyphilitic serums) and a sensitivity in syphilitic serums within 10 per cent of that of the control laboratory using the same technic.

TABLE 1.—*Approved Serologic Tests*

Complement fixation technics:
Kolmer (modification of the Wassermann test)
Eagle (modification of the Wassermann test)
Flocculation technics (standard):
Kahn standard
Kline diagnostic
Eagle macroflocculation
Hinton
Screen flocculation (supersensitive, for special purposes)
Kahn presumptive
Kline exclusion

Largely as a result of the objective self criticism which these cooperative and voluntary surveys have made possible, the average level of performance in the state health department laboratories has risen steadily; and similar intrastate or intramunicipal surveys conducted under the auspices of the corresponding state or municipal laboratories will do much to improve the general caliber of serodiagnostic work.

THE PROBLEM

It was, however, neither to be expected nor to be desired that serologic investigation should stop with the 1935 conference, for that would obviously mean stagnation rather than standardization. In the six years which have since elapsed, numerous other technics have been developed in this country, considered by their originators to be simpler, more reliable or more sensitive than the tests previously elaborated.

To a large extent this barrage of new procedures reflects the increased emphasis on serodiagnosis as a case finding procedure in the current syphilis control program. To a certain extent also it reflects the peculiar urge which seems to beset the soul of many serologists to create technics which, even though differing only slightly from others, will bear their names. This form of serologic exhibitionism is made worse by the almost religious fervor with which certain serologists polemically defend the virtues of their own tests over all others. Be that as it may, some of these suggested procedures are undoubtedly equal, and in some respects superior, to the technics which preceded them and on which they are based. Some, but by no means all, of the more promising of these new modifications are shown in table 2.

Quite properly, most of these new and apparently satisfactory procedures are to undergo evaluation in comparison with previously approved technics in a conference which has been tentatively announced for this fall [3] and which, like the first American conference, is designed to test the performance of these tests in the hands of the originators themselves. If all are approved (and there is reason to believe that most of them will have the necessary sensitivity and specificity) there will then be fifteen to twenty tests officially or tacitly designated as satisfactory.

Therein lies the rub. Faced with such a galaxy of tests, the physician who must interpret the laboratory report will find himself hopelessly confused in a veritable maze of proper names and plus marks. Many laboratories, in the effort to provide "super service," already run a battery of three, four, five or even nine tests on each specimen; and when the physician attempts to clarify contradictory findings by sending a duplicate specimen to a second laboratory, he may be faced with an array of serologic results such as those given in table 3, actually reported on a patient with no clinical evidence or history of syphilitic infection. Not only the average practitioner, but also the expert, whether clinician or serologist, is likely to be completely befuddled.

In this connection the two functions of the serologic tests for syphilis must be sharply differentiated. One, and far the lesser in importance, is in following the results of treatment. Here the serologic tests may furnish information which, in the hands of the informed expert, may be of value from the investigative point of view. As a practical guide to treatment, however, the value of the serologic tests is debatable. A respectable body of expert syphilologic opinion is now veering to the point of view that, except for purposes of study as just discussed, repeated blood tests on patients under treatment are almost valueless. By and large, syphilis early or late would be better managed by the average physician if, the diagnosis having been established, no serologic tests (spinal fluids excepted) were performed during treatment. If neither physician nor patient concerned himself with apparent serologic improvement, or the lack of it, two heads would rest more easily on a difficult pillow.

The second and far more important function of the serologic tests is in the diagnosis of syphilis. Here

TABLE 2.—*Serologic Tests to Be Evaluated*

Complement fixation technics:
Wadsworth, Augustus; Maltaner, Frank, and Maltaner, Elizabeth: J. Immunol. **35**: 105 (Aug.) 1938 *
Boerner, Fred, and Lukens, Marguerite: Am. J. Clin. Path. **9**: 13 (Jan.) 1939. Boerner, Fred; Jones, C. A., and Lukens, Marguerite, ibid. **10**: 141 (Nov.) 1940
Gaehtgens ("Pallida")† (Gaehtgens, W.: Ztschr. f. Immunitätsforsch. u. exper. Therap. **63**: 398 [June] 1929. Eagle, Harry, and Hogan, R. B.: J. Exper. Med. **71**: 215 [Feb.] 1940. Erickson, P. T., and Eagle, Harry: Ven. Dis. Inform. **31**: 31 [Feb.] 1940)
Flocculation technics:
Boerner-Jones-Lukens (cited above)
Davies micromodification of Hinton (Davies, J. A. V.: J. Lab. & Clin. Med. **22**: 959 [June] 1937)
Mazzini, L. Y.: Am. J. Clin. Path. **9**: 163 (March) 1939
Laughlen, G. F.: Canad. M. A. J. **33**: 179 (Aug.) 1935
Eagle microflocculation (Eagle, Harry, and Brand, A. F.: Am. J. Syph., Gonor. & Ven. Dis. **22**: 22 [Jan.] 1938)
Meinecke, E.: Ztschr. f. Immunitätsforsch. u. exper. Therap. **76**: 1965 (Nov. 22) 1929
Müller, R.: Klin. Wchnschr. **11**: 1916 (Nov.) 1932
Ide, S., and Ide, T.: Jap. J. Dermat. & Urol. (abst. sect.) **39**: 22 (Feb.) 1936
Chediak, A.: Dia. méd. **11**: 294 (April 10) 1939
Strauss slide modification of Kahn and Eagle (Strauss, J. H.: Am. J. Syph., Gonor. & Ven. Dis. **25**: 186 [March] 1941)
"Verification" test:
Kahn [4]

* Quantitative test.
† Or some American modification thereof. This depends on the use of a suspension of cultured spirochetes as antigen, instead of an alcoholic extract of beef heart, and has been recommended as perhaps more specific than the traditional Wassermann test.

2. Parran, Thomas; Hazen, H. H.; Sanford, A. H.; Senear, F. E.; Simpson, W. M., and Vonderlehr, R. A.: The Efficiency of State and Local Laboratories in the Performance of Serodiagnostic Tests for Syphilis, Ven. Dis. Inform. **18**: 4 (Jan.) 1937. Parran, Thomas; Hazen, H. H.; Mahoney, J. F.; Sanford, A. H.; Senear, F. E.; Simpson, W. M., and Vonderlehr, R. A.: Serodiagnostic Tests for Syphilis in Thirty-Nine State Laboratories, ibid. **18**: 273 (Aug.) 1937.

3. Second Evaluation of Serologic Tests, General News, J. A. M. A. **115**: 143 (July 13) 1940.

their interpretation is in the hands of physicians of all medical disciplines, most of whom deal with syphilis only rarely, and nearly all of whom are completely in the dark as to the newest refinements of serologic technic. To such physicians the multiplication of technical procedures, and the use in one laboratory of a serologic "battery" larger than the two or three tests desirable for intralaboratory check, serve no useful purpose.

On the contrary, the larger the number of tests applied to each serum the higher will be the proportion of serums in which conflicting results will be obtained and in which the physician must therefore evaluate the serologic findings. All too often, given a patient with findings suggestive, but not diagnostic, of syphilitic infection, and given a serologic report of e. g. Kahn positive, Hinton doubtful and Kolmer negative, the physician will seize on the positive result as confirming his clinical suspicions, dismiss the negative result as due to a laboratory error or an insensitive test and institute treatment for syphilis.

To a limited extent the problem of evaluation presented by multiple or conflicting tests is one of education. If every physician would hold fast to the following principles, much of the existing confusion as to the correct interpretation of the laboratory report, and many errors in diagnosis, errors both of omission and commission, would be avoided.

1. All the Wassermann and flocculation tests for syphilis in which tissue extracts are used as antigen are designed to detect the same substance, so-called reagin, which is probably an antibody to Spirochaeta pallida.[4]

2. Basically there are only two such tests for syphilis, a complement fixation and a flocculation test. Every one of the dozens of flocculation technics (and every one of the equally numerous Wassermann technics) is fundamentally identical, differing only by variations, often very minor, in the method of preparation of antigen, in the concentration of salt solution, cholesterol or other reagents, or in such technical differences as the time of incubation, the temperature at which the test is performed or other (often infinitesimally small) details of procedure. Any one of the technics now in general use "is an entirely adequate test in the hands of a competent worker. Conversely, not one of them is reliable in the hands of an incompetent worker. The method of choice is dictated by the training of the individual technician, his personal aptitudes and his experience with the various tests." [5]

3. Finally, and most important of all for an intelligent interpretation of the serologic report, any two tests applied to the same serum may, in the borderline case, give discrepant results; and the more tests used by any one laboratory the greater will be the number of serologic conflicts requiring special interpretation.

Such "serologic education" of the average practitioner would do much to clarify a confusing situation. However, that confusion is engendered in the laboratory, and we feel that its solution also lies primarily in the laboratory.

A SUGGESTED SOLUTION

Research will and must proceed. Serologists will and should continue to improve serologic tests by whatever technical modifications seem desirable. However, it follows also that the present chaotic situation with respect to the multiplicity of tests will become continuously worse rather than better. The ultimate standardization of serologic technic seems less and less likely of fulfilment, at least until that improbable future day when, reagin having been found to be chemically identifiable, a simple chemical test can replace the present complicated biologic procedures.

Since standardization of technic is not immediately attainable, some order may be brought out of existing chaos by standardization in a simpler direction—that of reporting serologic results. To that end the following change in the method of reporting the results of serologic tests seems immediately desirable and is recommended to the U. S. Public Health Service, to the American Society of Clinical Pathologists and to author serologists for their serious consideration:

TABLE 3.—*An Actual Serologic Report: What Does It Mean?*

Kline diagnostic	2+
Kline presumptive	4+
Mazzini	2+
Kahn standard	0
Kahn presumptive	++++
Kahn verification	0
New York State complement fixation	4.7 units
Eagle complement fixation	Zone (003444300)
Eagle macroflocculation	Positive
Kolmer	440
"Pallida"	Doubtful

1. In recognition of the fundamental identity of all the serodiagnostic tests for syphilis, the generic term "Serologic Test for Syphilis," conveniently abbreviated as "STS", is recommended for general adoption. This generic term embraces the five types of test in current use:

Screen flocculation: Any supersensitive flocculation technic known to give false positive or doubtful results in a variable proportion of normal individuals.

Flocculation: Any standard flocculation technic in which an alcoholic tissue extract is used as antigen.

Complement Fixation: Any standard Wassermann technic in which an alcoholic tissue extract is used as antigen.

Spirochetal Complement Fixation: Any complement fixation technic employing a spirochetal suspension as antigen rather than beef heart extract.

Verification: The present Kahn verification test [6] or other similar tests subsequently to be developed.

2. By general agreement, the formal laboratory report to the physician should be made on an over-all, composite basis, simply as "Serologic Tests for Syphilis—Positive," "Serologic Tests for Syphilis—Doubtful" or "Serologic Tests for Syphilis—Negative."

3. The results of the individual tests, on which that over-all summation is based, may be given on the reverse of the serologic report.

4. Finally, and highly important, the serologic report slip should contain an informative statement as to the significance of this composite report, e. g.:

Positive: A result of positive implies that all the tests used in this laboratory (cf. reverse of this report) indicate the presence of a reactive factor in the serum commonly associated with syphilitic infection. However, a diagnosis of syphilis must not be made solely on the basis of a single positive test. If the serologic result is not supported by history and/or physical findings, a second specimen of blood should be submitted for check. If the result of the check also is positive,

4. Eagle, Harry: Laboratory Diagnosis of Syphilis, St. Louis, C. V. Mosby Company, 1937.

5. Eagle, Harry: The Serodiagnosis of Syphilis, Supplement 9 to Venereal Disease Information, 1938, p. 5.

6. Kahn, R. L.: Serologic Verification Test in Diagnosis of Latent Syphilis, Arch. Dermat. & Syph. **41**: 817 (May) 1940.

syphilis is indicated with a high degree of probability, unless the patient has, or has just recovered from, some intercurrent infection which may cause a false positive result.

Doubtful: A report of doubtful implies that the individual tests used in this laboratory were either discrepant or inconclusive (incomplete aggregation in the flocculation test, partial fixation of complement in the Wassermann). A doubtful result may or may not indicate syphilis. If the patient is known to have been infected with syphilis, and particularly if he has been treated, a doubtful reaction may be regarded as positive. If there is no history or clinical evidence of syphilis, a doubtful test indicates the necessity for, first, a particularly careful review of history and physical findings and, second, an immediate repeat serologic test for check. If the result of the check examination is likewise doubtful, the serologic examination should be repeated in this and other laboratories and, if necessary, several times by several different serologic procedures, before the possibility of syphilis is dismissed.

Negative: A report of negative implies that the particular tests used in this laboratory did not indicate the presence of reagin (absence of visible aggregation in the flocculation test and no fixation of complement [complete hemolysis] in the complement fixation test). A negative report does not exclude the possibility of syphilis.

Table 4.—*Suggested Composite Reporting of Two Tests*

Test A	Test B	Suggested Over-All Report
Positive	Positive	Positive
Positive	Doubtful	
Doubtful	Positive	
Positive	Negative	Doubtful
Negative	Positive	
Negative	Doubtful	
Doubtful	Negative	
Doubtful	Doubtful	
Negative	Negative	Negative

Table 5.—*Suggested Composite Reporting of Three Tests*

Test A	Test B	Test C	Suggested Over-All Report
Positive	Positive	Positive	Positive
Positive	Positive	Doubtful*	
Positive	Positive	Negative*	Doubtful
Positive	Doubtful	Doubtful	
Positive	Doubtful	Negative	
Doubtful	Doubtful	Negative	
Doubtful	Doubtful	Doubtful	
Positive	Negative	Negative	
Doubtful	Negative	Negative	Negative
Negative	Negative	Negative	

* There are obviously multiple combinations of three tests, in which e. g. two will be positive and the third doubtful. For the sake of clarity, those combinations are not distinguished in the table.

Frequently a positive test is absent in the early stages of primary syphilis. Negative reactions may occur as a result of treatment. If there is any clinical reason to suspect syphilis, a negative result should be checked by a second blood specimen. The diagnosis of early primary syphilis should, if possible, be made by darkfield rather than by serologic test.

Physician and laboratory alike should bear in mind that, when screen flocculation tests are employed, the result should be reported to the physician only if it is negative. Because of their known tendency to give false reactions, a positive or doubtful result unsupported by some standard procedure may or may not be of significance and can serve only to confuse the physician, while, if the standard procedure is positive or doubtful, the similarly positive or doubtful screen test is of no confirmatory value. On the other hand, a negative screen test may safely be reported, since it may properly be assumed that a serum which is negative with one of the supersensitive screen tests would have been similarly negative with the standard test on which the screen test is based. The correct use of screen procedures has been commented on more fully in the editorial columns of THE JOURNAL.[7]

The onus of unifying conflicting serologic results is thus taken out of the hands of the physician and placed where it belongs, in the laboratory itself. Certainly the laboratory director, cognizant of the day to day variations in the sensitivity and reliability of the individual technics, is better able to evaluate conflicting results than is the physician, to most of whom a battery of names such as Mazzini, Hinton, Eagle and Kline is a battery of names and but little else. Nor will the task of making an over-all report be a particularly easy one, even for the laboratory director. In the simplest possible case, when two flocculation tests are used as an intralaboratory check, there are nine possible combinations of results (table 4). If three tests are used, the number of possible combination becomes twenty-seven (table 5) and, if five tests are used, there are one hundred and twenty-five possible combinations.

It is to be noted that many different types of conflicting results are reported as doubtful, for that indeed is what they are. The physician who receives such a report on a patient with no history or clinical evidence of syphilitic infection is in a perplexing situation and one which often requires special skills and special knowledge. We[8] have elsewhere outlined a suggested course of study on patients suspected of giving biologic false reactions. Those same procedures are equally applicable in the present instance. Often enough, after the physician has exhausted all possible avenues of approach he must deliberately choose between the lesser of two evils, between a possible error of omission and one of commission. Although it is generally advisable to withhold treatment and to keep the patient under close clinical and serologic observation for as long as may be necessary to establish or eliminate the diagnosis of syphilis, many factors, such as marital status and pregnancy, must affect that decision.

SUMMARY

The ever increasing number of tests available for the serum diagnosis of syphilis, and the necessity for interpreting conflicts between them, place a burden of evaluation on the physician which, lacking the necessary technical knowledge, he is often not qualified to assume.

Although the standardization of serologic technic is not yet feasible, it is possible to standardize the method of reporting serologic results. In the interests of simplicity, clarity and the best possible utilization of the laboratory data it is therefore recommended that the proper names now used in reporting serologic tests be replaced by the generic term "Serologic Tests for Syphilis" (abbreviated "STS"), of which in routine practice there are three catagories: screen flocculation, standard flocculation and complement fixation. It is further recommended that the results of the laboratory findings, whether flocculation or complement fixation tests, single or multiple tests, be reported on an over-all composite basis, as "Serologic Tests for Syphilis—Positive, Doubtful or Negative."

7. "Presumptive," "Exclusion" and "Screen" Tests for the Serodiagnosis of Syphilis, editorial, J. A. M. A. **112:** 541 (Feb. 11) 1939.

8. Moore, J. E.; Eagle, Harry, and Mohr, C. F.: Biologic False Positive Serologic Tests for Syphilis: III. A Suggested Method of Approach to their Clinical Study, J. A. M. A. **115:** 1602 (Nov. 9) 1940.

The onus of unifying conflicting laboratory findings is thus placed on the individual best qualified, the laboratory director. No information of diagnostic significance is withheld from the physician, for the reverse of the report sheet will carry a statement as to the results obtained with the individual tests, on which the over-all report is based.

GONORRHEAL URETHRITIS IN THE MALE

TREATMENT WITH SULFAPYRIDINE AND SULFATHIAZOLE

CHARLES A. W. UHLE, M.D.

LEROY W. LATOWSKY, M.D.

AND

FRANK KNIGHT, M.D.

PHILADELPHIA

The chemotherapeutic treatment of gonorrhea, when first inaugurated, promised Utopia to the physician in the ease of management and to the patient in the rapidity of cure. Sufficient evidence has accumulated and adequate time has now elapsed to point out the fallacy of first impressions. This fact must be appreciated if gonorrhea is not to become an even greater problem than it was prior to the introduction of the sulfonamide derivatives.

The Cooperative Clinical Committee for the Study of Treatment of Gonorrhea in the Male [1] has stated that in the use of sulfanilamide alone cure can be promptly attained in only 25 to 40 per cent of dispensary patients and that reports of sulfapyridine therapy establish it as being 25 to 50 per cent more efficient. Other derivatives have been studied, but, mostly because of untoward toxic effects, they have been supplanted by sulfapyridine and sulfathiazole. These two drugs offer a higher percentage of cures than any others heretofore utilized therapeutically.

MATERIAL

During the past year we conducted a study of the effectiveness of chemotherapy in gonorrhea in two parallel groups of cases. Sulfapyridine and sulfathiazole were given in a series of 87 and 55 cases respectively.[2] The patients, all males, were ambulatory and were seen in the Genito-Urinary Clinic of the Philadelphia General Hospital. The cooperative spirit and intellectual level of the patients treated were not outstanding. This was a serious obstacle to satisfactory termination of treatment but was overcome by a sympathetic approach to each patient and by the supervision of contacts by the social service department.

TREATMENT AND RESULTS

Because of the large number of patients seen in each clinic hour and the inability to combine local therapy with oral therapy in each instance, it was decided to limit the treatment of every patient to oral medication. In this manner the treatment of the two groups was standardized to follow certain lines which permitted a fairer comparison in the final analysis.

In the sulfapyridine-treated group 92 per cent were cured and 8 per cent were not, and in the sulfathiazole-treated group 96 per cent were cured and 4 per cent were not (table 1). The failures were due in every instance to resistant strains of gonococci which failed to respond to small or large doses or to failure of the patient to cooperate. Medical science recognizes the word cure as a flexible one, and certainly in gonorrhea such a term must be used cautiously. Ninety-two and 96 per cent cures respectively are noteworthy, but when broken down by further analysis one can see that cure is not immediate or instantaneous. Ninety-two per cent represents an average of fifty-one days, with a range of from fourteen to one hundred and sixty-two days, for a cure to be effected with sulfapyridine. In comparison, 96 per cent represents an average of twenty-eight days, with a range of from seven to eighty-eight days, for a cure to be effected with sulfathiazole. These figures were obtained by taking the time elapsed from the beginning of specific therapy to the appearance of the first culture negative for the gonococcus.

To run a second series of cases, employing the combined form of therapy with all other factors the same, would be most expedient. However, it is our impression from our experience in clinic and private practice that it is preferable to use the time-honored standard routine of treatment along with chemotherapy. This impression is in direct line with the observations of the committee composed of representatives of the American Neisserian Medical Society and the United States Public Health Service.[3]

TABLE 1.—*Summary of the Results of Treatment of Gonorrheal Urethritis in the Male with Sulfapyridine and Sulfathiazole in the Philadelphia General Hospital, 1939-1940*

	Total Patients		Cured		Not Cured		Defaulters	
	Treated	Followed	No.	%	No.	%	No.	%
Sulfapyridine, 87 cases								
Total cases	87	62	57	92	5	8	25	28.8
Acute urethritis	83	59	54	91.5	5	8.5	24	28.8
Anterior	64	43	38	88.5	5	11.5	21	32.8
Posterior	19	16	16	100	0	0	3	15.8
Subacute urethritis	4	3	3	100	0	0	1	25
Anterior	1	1	1	..	0	..	0	..
Posterior	3	2	2	100	0	0	1	33.3
Anterior urethritis (total)	65	44	39	88.5	5	11.5	21	32.4
Posterior urethritis (total)	22	18	18	100	0	..	4	18.2
Sulfathiazole, 55 cases								
Total cases	55	50	48	96	2	4	5	9
Acute urethritis	52	48	46	..	2	..	4	..
Anterior	34	31	29	..	2	..	3	..
Posterior	18	17	17	..	0	..	1	..
Subacute urethritis	3	2	2	..	0	..	1	..
Anterior	2	1	1	..	0	..	1	..
Posterior	1	1	1	..	0	..	0	..
Anterior urethritis (total)	36	32	30	94	2	6	4	11
Posterior urethritis (total)	19	18	18	100	0	..	1	5

DOSAGE AND RESULTS

Chemotherapy has its virtues. First, the patient is made more comfortable by the disappearance of symptoms and less liable to contaminate his surroundings in consequence of the almost immediate cessation of urethral discharge. The average duration of the discharge

From the Genito-Urinary Clinic of the Philadelphia General Hospital.

Merck & Co., Inc., of Rahway, N. J., furnished the sulfapyridine used and the Maltbie Chemical Co., of Newark, N. J., furnished the sulfathiazole.

The members of the medical and urologic staffs, the outpatient department, the laboratory and the social service department of the Philadelphia General Hospital cooperated in this study.

1. Pelouze, P. S.: The Pharmacopeia and the Physician: Oral and Medical Treatment of Gonorrhea in the Male, J. A. M. A. **114:** 1878-1881 (May 11) 1940.

2. LaTowsky, L. W.; Knight, Frank, and Uhle, C. A. W.: The Treatment of Gonorrheal Urethritis in the Male with Sulfapyridine: A Study of Eighty-Seven Cases, Am. J. Syph., Gonor. & Ven. Dis. **25:** 445 (July) 1941. Knight, Frank; Uhle, C. A. W., and LaTowsky, L. W.: The Treatment of Gonorrheal Urethritis in the Male with Sulfathiazole: A Study of Fifty-Five Cases, J. Urol. **44:** 748 (Dec.) 1940.

3. Pelouze, P. S., and others: Gonorrhea in the Male: Results of Treatment with Sulfanilamide, J. A. M. A. **115:** 1630-1633 (Nov. 9) 1940.

in treatment with sulfapyridine was three days, with a range of from two to eight days, and with sulfathiazole, three days also, with a range of from one to seven days. This early clinical response is more rapid than that obtained with local therapy alone. Second, it is our impression that complications are materially reduced in number and possibly in some cases actually prevented. There were no complications in our group of 105 cured patients.

In the 105 cases in which cure was effected the average dose of both sulfapyridine and sulfathiazole to effect a cure was 3 Gm. daily for eight days (table 2). Many authorities favor a higher initial dose with a reduction in three or four days, continuing thus to the completion of an eight to ten day course. The average total dose to effect a cure with sulfapyridine was 23.5 Gm., and with sulfathiazole 28 Gm. However, when studying the range of dosage requisite to produce cure, we found that it averaged for sulfapyridine from 2 Gm. daily for seven days (14 Gm.) to 3 Gm. daily for thirty-seven days (111 Gm.), and for sulfathiazole, from 3 Gm. daily for four days (12 Gm.) to 3 Gm. daily for twenty-eight days (68 Gm.).

From the outline of dosage just given it would seem that continuance of the drug beyond an eight to ten day limit is necessary in some cases. An alternative would be to change to some other sulfanilamide derivative. In cases of refractory gonorrhea we are of the opinion that two courses with a rest period between are therapeutically better than a long-continued course, and safer with respect to severe toxic reactions. In 3 of the 87 patients receiving sulfapyridine exfoliative dermatitis of varying degree developed.[4] The course of treatment of each of these patients was protracted.

TABLE 2.—*Dosage of Sulfapyridine or Sulfathiazole Required to Effect a Cure in Gonorrheal Urethritis in the Male: Analysis of One Hundred and Five Cases*

	Sulfapyridine	Sulfathiazole
Average dosage to effect cure	3 Gm. daily for 8 days	3 Gm. daily for 8 days
Range of dosage to effect cure	2 Gm. daily for 7 days to 3 Gm. daily for 37 days	3 Gm. daily for 4 days to 3 Gm. daily for 28 days
Average total dosage to effect cure	23.5 Gm.	28 Gm.
Range of total dosage to effect cure	12 Gm. to 111 Gm.	12 Gm. to 48 Gm.

TOXICITY

Among ambulatory patients it has been customary to maintain lower doses than would be used if the patient were hospitalized. As a result, severe toxic reactions are experienced less often. This precaution is necessary because of the responsibility of patients at work, and because they cannot be under constant medical observation and because those driving vehicles cannot afford the risk of accidents as a result of vertigo and other symptoms.

Among 76 of the sulfapyridine-treated patients who returned to the clinic for two or more visits, mild toxic symptoms were experienced by 75 per cent. Among 52 of the sulfathiazole-treated patients who returned for two or more visits, mild symptoms were experienced by 11.5 per cent. The commonest symptoms for both groups were headache, nausea and vertigo (table 3).

4. LaTowsky, L. W.; Uhle, C. A. W., and Knight, Frank: Severe Toxic Skin Reactions Following Sulfapyridine Therapy, M. Times **69**: 120-124 (March) 1941.

CRITERIA OF CURE

Chemotherapy has destroyed the value of the former provocative tests. Reliance cannot be placed on them, because the patient who has gone into a clinically negative phase under chemotherapy can be put through the routine of provocation without having a response, despite the fact that smear and cultural studies still give positive results. This unhappy state of affairs is seen in more than 90 per cent of cases and can be demonstrated within the first week of treatment. The inadequacy of provocation throws the responsibility of detection on carefully performed smears and cultures of the urinary sediment and strippings of the prostate, the seminal vesicles and the urethra.

Bacteriologic work in the treatment of gonorrhea with the sulfonamides assumes the greatest importance, which it did not necessarily possess with the older forms of treatment. One realizes that not every physician will be able to give his patient the advantages of routine cultural work. It is suggested that the physician then employ the knowledge of bacteriologic concepts established by others and treat his patients to the end of and even beyond the average period of positive cultures. This treatment, of course, depends on the clinical state of the patient. The clearance of the urine and the disappearance of shreds are not reliable as an index of cure in the absence of smears and cultures. One cannot dispute the value of the observation, however, as a useful clinical guide.

TABLE 3.—*Analysis of Symptoms of Toxicity in Response to the Administration of Sulfapyridine and Sulfathiazole*

	Sulfapyridine 76 Patients Returning to the Clinic for Two or More Visits		Sulfathiazole 52 Patients Returning to the Clinic for Two or More Visits	
	Number	Percentage	Number	Percentage
No complaints	19	25	46	88.5
Complaints	57	75	6	11.5
Headache	28	36.8	3	5.7
Nausea	13	17.1	2	3.8
Vertigo	3	3.9	1	1.9
Exfoliative dermatitis	3	3.9	..	...
Anorexia	2	2.6	..	...
Night sweats	1	1.3	..	...
Tinnitus	1	1.3	..	...
Lassitude	1	1.3	..	...
Chills	1	1.3	..	...
Pruritus	1	1.3	..	...
Vomiting	1	1.3	..	...
Diarrhea	1	1.3	..	...
Constipation	1	1.3	..	...

TABLE 4.—*Analysis of Two Hundred and Forty-Eight Urethral or Prostatic Exudates Positive for the Gonococcus by Either Smear or Culture or Both*

	Exudates from Patients with Symptoms of Gonorrheal Urethritis Total: 135 Cases		Exudates from Patients Without Symptoms of Gonorrheal Urethritis Total: 113 Cases	
Report of Laboratory	Number	Percentage	Number	Percentage
Positive smear, positive culture	107	79	0	..
Negative smear, positive culture	26	19.3	112	99
Positive smear, negative culture	2	1.8	1	1
Total positive cultures	133	98.5	112	99
Total positive smears	109	81	1	1

SMEAR VERSUS CULTURE

Under chemotherapy the urethral discharge disappears in an average of three days. It is difficult after this time to obtain a positive smear, but culture of the

urine and secretions, when the proper technic and cultural mediums are used, is always positive for the gonococcus.[5] The importance of culture over smear is shown in table 4, which analyzes 248 urethral and prostatic exudates.

On what basis should a statement of cure be made? From the evidence presented it should not be pronounced on the basis of the smear but on the basis of repeated sterile cultures, at least three, obtained at intervals of five to seven days. It is in order, therefore, that where the laws provide for the use of the smear in diagnosing the presence or absence of gonorrhea revision should be made to include the culture in every case.

CARRIER STATE

The carrier state is one of the most serious problems created by chemotherapy. The cessation of discharge in three days under active treatment with an active carrier state for several weeks thereafter is a menace to society. Sexual intercourse in the majority, acting similarly to the provocative tests mentioned previously, does not cause recurrence of discharge. Here, then, is a vicious cycle, since it is possible that the asymptomatic carrier[6] can transmit his sulfonamide-fast strains to a second person. The second person becomes an active carrier with the disease in the asymptomatic form. Transfer of the organism to his sexual partner may lead to clinical evidences of active gonorrhea.[6]

TABLE 5.—*Carrier State in Treatment of Gonorrheal Urethritis with Sulfonamides*

	Analysis of 57 Cures with Sulfapyridine		Analysis of 48 Cures with Sulfathiazole	
	Average	Range	Average	Range
Time (in days) elapsing between the beginning of specific therapy and cessation of the discharge	3	2 to 8	3	1 to 7
Time (in days) from beginning of therapy with specific and appearance for the first time of a culture of prostatic fluid negative for the gonococcus.....	51	14 to 162	28	7 to 88
Time (in days) elapsing from disappearance of symptoms of gonorrheal urethritis to last culture of prostatic fluid positive for the gonococcus.....	17.7	2 to 50	17	3 to 53

In the study of the sulfonamide-fast properties of the gonococcus during treatment with sulfapyridine and sulfathiazole we have defined the carrier state as follows: the time which elapses from the disappearance of symptoms of gonorrheal urethritis to the last culture of the prostatic fluid or the urine containing the secretions positive for the gonococcus (table 5). The carrier state for sulfapyridine averages seventeen and seven-tenths days, with a range of from two to fifty days, while that for sulfathiazole averages seventeen days, with a range of from three to fifty-three days.

SOCIAL ASPECTS

The rapidity with which the symptoms disappear and the discharge ceases creates a false sense of security in the patient. This applies to both the ignorant and the indifferent patient. The physician must take time to explain to his patient the vagaries of chemotherapy, so that at all times a mutual bond of cooperation will exist. Through the proper approach to the patient, with tact, understanding and interest in his case, the percentage of default in clinic work should be materially reduced. Those whom the physician cannot hold can be made to cooperate through the efforts of a competent social service department. If the social service department fails, a reminder from the state department of health or the services of the police department will accomplish the necessary result.

It is of interest that in our series of patients, who were for the most part unintelligent persons, the defaulting decreased in direct proportion to the time taken to explain what we wished to accomplish. In the second place, enough medicine was given to last only to the time of the next visit. Third, segregation was impossible and good and bad results were communal knowledge. The high percentage of good results fostered a spirit of cooperation and faithfulness. Fourth, the social service department rendered valuable aid. Among the 87 patients treated with sulfapyridine there were 25 defaulters (28.8 per cent), compared to 5 defaulters (9 per cent) among 55 patients treated with sulfathiazole. The latter group was our second series.

CONCLUSIONS

1. Sulfapyridine and sulfathiazole are equally efficacious in the treatment of gonorrheal urethritis in the male.
2. Toxicity is manifested less with sulfathiazole than with sulfapyridine.
3. Sulfathiazole is the drug of choice in the treatment of gonorrhea.
4. It would seem that a combination of oral chemotherapy and local treatment is preferable.
5. Chemotherapy has altered our conceptions of the provocative tests.
6. The value of the culture over the smear should be stressed in pronouncing a patient cured.
7. A social menace is created by the asymptomatic carrier.

255 South Seventeenth Street.

5. A satisfactory cultural technic is that outlined and carried through on each patient in this study by Drs. H. A. and L. Shelanski of the Department of Zoology of the University of Pennsylvania: A swab moistened with sterile saline solution is used to collect the exudate from the urethra or the prostate. The swab is streaked on chocolate blood agar plates, which are then incubated in an atmosphere of 10 per cent carbon dioxide and an excess of moisture at a temperature of 37.5 C. for twenty-four to forty-eight hours. At the end of this period typical colonies are isolated and placed on chocolate blood agar slants. These slants are incubated under the same conditions as the plates. The culture on the slant is tested for purity by the Gram stain technic, and sugar tubes are inoculated. The sugar tubes, containing dextrose, maltose and mannite with a broth base, are incubated for twenty-four to forty-eight hours at 37.5 C. Gonococci ferment only dextrose, with the production of acid and no gas; they do not ferment the other sugars. The organisms from the chocolate blood agar slants are also tested by the alkali solubility test.

6. Smith, F. C.: The Gonorrhea Problem, editorial, Weekly Roster & M. Digest **36**: 441 (Nov. 30) 1940.

Calcium and Phosphorus Shortage.—In young children, this may result in stunted growth, weakened or soft bones, and teeth which are malformed or decaying, since these two elements are essential to building new and healthy bone tissue. The same effects may follow if the mother's diet is lacking in these elements during pregnancy or while nursing her child, although she may draw on her own bones and teeth to supply the calcium and phosphorus needed for the bones and teeth forming in the child. The character of the bones and teeth is largely determined by whether an abundant supply of these two elements was available in prenatal life and during the first few years of postnatal life, though the bony structure of adults will suffer to a lesser extent when there is lack of either calcium or phosphorus over a sufficiently long period.—Bogert, L. Jean, and Porter, Mame T.: Dietetics Simplified, New York, Macmillan Company, 1940.

GONOCOCCIC CONJUNCTIVITIS

A COMPARISON OF SULFANILAMIDE, SULFAPYRIDINE AND SULFATHIAZOLE IN THE TREATMENT OF ONE HUNDRED AND TWENTY CASES

PHILIP MERIWETHER LEWIS, M.D.
MEMPHIS, TENN.

In the past few years so many articles have appeared in the ophthalmic journals concerning the treatment of gonococcic conjunctivitis with sulfanilamide that one hesitates to burden the literature with any further reports. However, considerable difference of opinion still exists as to the best method of using the drug. While most observers have used the sulfonamides orally, several have reported their experiences with the drugs used locally in the eye. Rein and Tibbetts [1] employed a 0.5 per cent solution of sulfanilamide in physiologic solution of sodium chloride as an irrigation every fifteen minutes night and day. They reported good results in 15 cases, in which negative smears were obtained on an average of six and eight-tenths days. Panneton [2] has recently published an interesting account of treating this disease in 10 cases by the insufflation of the conjunctival sac with the powdered drug every three hours. In 8 he used powdered sulfanilamide and in 2 powdered sulfapyridine.

Bruens [3] reported the local use of a sulfanilamide derivative called albucid on 3 infants with great success, claiming negative smears in twenty-four hours. He used the drug in a solution of from 10 to 30 per cent and dropped it on the everted conjunctiva of both upper and lower lids, after which he massaged the conjunctival surfaces together. This treatment was repeated every half hour. He also recommended irrigation with physiologic solution of sodium chloride every fifteen minutes. Pillat [4] used the same preparation as a 10 per cent solution locally every thirty minutes in gonoblennorrhea neonatorum. Irrigations with physiologic solution of sodium chloride every fifteen minutes day and night were also employed. He found that the gonococci disappeared from the conjunctiva in from twenty-four to forty-eight hours. Guyton [5] reported treating gonococcic conjunctivitis in 1 instance with a 5 per cent sulfanilamide ointment every hour, but after twenty-four hours there was no improvement, so systemic chemotherapy was started.

We used in 2 cases of our series an 0.8 per cent solution of sulfanilamide locally after the method of Rein and Tibbetts.[1] No improvement was evident after twenty-four hours; therefore it was deemed inadvisable further to withhold internal medication.

Mengel [6] demonstrated that ordinary doses of sulfanilamide given orally produce concentrations of from 1.5 to 3.2 mg. per hundred cubic centimeters in the aqueous and vitreous humors. When, however, the drug was instilled in the conjunctival sac, absorption was poor, so that only traces, less than 0.1 mg. per hundred cubic centimeters, were present in the aqueous humor. While this indicates that the local use of sulfanilamide would be inefficient in intraocular infections, it does not imply that it might not work well for conjunctival involvement.

Most observers have used the drug orally but have reported only small series of cases. Thus Hageman,[7] Heinemann [8] and McKee [9] each described their experience with 1 case. Fernandez [10] and Newman [11] reported 8 cases and several other observers [12] smaller numbers. Barbour and Towsley [13] reported 15 cases, as did Rein and Tibbetts [1] and also Michels.[14] Bower and Frank [15] reported their results in a series of 21 cases. Sysi [16] used sulfapyridine in 11 cases with excellent results. Mullen [17] in a recent article reported 42 cases at the Philadelphia General Hospital in which relatively large doses of sulfanilamide internally and the instillation of an 0.8 per cent solution locally every ten minutes day and night gave satisfactory results. There seems to be complete agreement among all who have used sulfanilamide and its related compounds in the treatment of gonococcic infections of the eye that they are of great value. However, since no one has previously published such a large series of cases or a comparison of the efficacy of sulfanilamide, sulfapyridine and sulfathiazole in gonococcic ophthalmia, it was thought that this report might prove to be of some value.

This paper is a brief account of the results obtained in the past four years in the isolation department of the John Gaston Hospital in Memphis. The first patient with gonococcic ophthalmia treated with one of the sulfonamides was in June 1937. Since that time all patients have been given the benefit of these drugs. To date (May 1941) a total of 120 patients have been treated. No patient is included in this series unless a gonococcic infection was definitely diagnosed, both clinically and bacteriologically. In most instances the gonococcus was demonstrated on each of two smears taken on admission and examined by different investigators. One smear was examined in the laboratory of the isolation department and the other in the main laboratory of the John Gaston Hospital. Numerous patients admitted with the diagnosis of gonococcic infection proved to have conditions due to other bacteria or to have inclusion body blennorrhea and were therefore excluded from this series.

Until April 1, 1940 sulfanilamide was used in all cases. From April 1, 1940 to Feb. 1, 1941 sulfapyridine only was used. Since February 1 sulfathiazole has been employed.

Read before the American Ophthalmological Society, Hot Springs, Va., May 31, 1941.

From the Department of Ophthalmology of the University of Tennessee College of Medicine.

Dr. Gilbert Levy, director of the isolation department, and the hospital staff assisted in this work.

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17. Mullen, Carroll R.: Treatment of Gonorrheal Diseases of the Eye with Sulfanilamide, Arch. Ophth. **25:** 655 (April) 1941.

TREATMENT

The usual routine at the Isolation Hospital is as follows: As soon as a patient is admitted smears are taken for examination, and if the patient has the clinical appearance of having a gonococcic infection, treatment with one of the sulfonamides is started at once. When sulfanilamide was used, an initial dose was given of from ⅓ to ½ grain (0.02 to 0.03 Gm.) per pound (454 Gm.) of body weight, according to the severity of the case. In the newborn approximately ½ grain per pound of body weight was given, and occasionally a slightly larger amount if the infection seemed unusually severe. A dose was given every four hours thereafter in an amount sufficient to give a daily total of from ½ to 1⅕ grains (0.03 to 0.08 Gm.) per pound (without counting the initial dose). Usually this dose was continued five or six days or until significant clinical improvement and negative smears indicated that the drug might be reduced or stopped.

Somewhat smaller doses of sulfapyridine are given, about ⅓ grain per pound for adults and a little less than ½ grain per pound for infants as the initial dose. Absorption of sulfapyridine is not nearly as definite as is that with sulfanilamide. Long and Bliss [18] and other observers have noticed individual variations in the capacity to absorb this drug. They recommend basing the dose on the amount required in the individual case to produce the desired blood concentration of the drug. This may be as low as 4 mg. per hundred cubic centimeters in cases of mild involvement to 11 mg. in those of severe involvement.

In our own series we have not made a practice of determining the blood concentration of the drug. The patients have responded rapidly to moderate doses. In adults usually the initial dose of 30 to 60 grains (2 to 4 Gm.) and an average of about 15 grains (1 Gm.) every four hours thereafter has produced such a decided improvement that the dose could be reduced or discontinued in from thirty-six hours to four days. In our experience it has been unnecessary to continue sulfapyridine more than twenty-four hours after the condition is cured clinically and bacteriologically. There have been no relapses with sulfapyridine.

Our experience with sulfathiazole in this condition has been very limited. We have used doses approximately the same as or slightly larger than we employed with sulfapyridine. With this drug both absorption and excretion are more rapid than with the other two, so the daily dose should always be divided and administered every three or four hours in order to maintain the proper blood concentration. With our few cases the time required for a "cure" was longer and the hospitalization longer than with sulfapyridine. Furthermore, 1 case (5 in table 2) showed only slight improvement on the eighth day of treatment. A change to sulfapyridine produced a cure in thirty-six hours. We therefore feel at present that sulfapyridine is somewhat superior to sulfathiazole in the treatment of gonococcic conjunctivitis.

TABLE 1.—*Sulfapyridine Treatment*

Case	Age of Patient	Eye Involved	Duration Before Admission	Apparently Cured	Days in Hospital	Corneal Involvement	Visual Results	Total Dose of Sulfapyridine	Blood Changes
1	20 years	O. D.	2 days	2 days	5	None	Unimpaired	270 grains	None
2	3 days	O. U.	1 day	2 days	5	None	Unimpaired	18 grains	None
3	11 days	O. U.	6 days	36 hours	4	None	Unimpaired	24 grains	None
4	17 years	O. U.	3 days	3 days	6	None	Unimpaired	360 grains	None
5	20 years	O. S.	2 days	4 days	6	None	Unimpaired	375 grains	None
6	6 years	O. S.	3 days	3 days	5	None	Unimpaired	180 grains	None
7	4 days	O. U.	1 day	2 days	4	None	Unimpaired	35 grains	None
8	6 years	O. D.	6 hours	2 days	4	None	Unimpaired	138 grains	None
9	8 days	O. U.	2 days	1 day	3	None	Unimpaired	21 grains	None
10	8 days	O. S.	1 day	1 day	3	None	Unimpaired	21 grains	None
11	6 years	O. U.	2 days	3 days	5	None	Unimpaired	180 grains	None
12	3 years	O. S.	1 day	1 day	3	None	Unimpaired	85 grains	None
13	40 years	O. U.	7 days	8 days	10	Ulcer on admission	Unchanged	645 grains	None
14	21 days	O. U.	4 days	3 days	4	None	Unimpaired	35 grains	None
15	8 days	O. D.	3 days	3 days	6	None	Unimpaired	27 grains	None
16	21 years	O. S.	1 day	1 day	4	Old scars	Unchanged	330 grains	None
17	3 months	O. U.	7 days	2 days	5	None	Unimpaired	53 grains	None
18	13 days	O. U.	6 days	4 days	7	None	Unimpaired	30 grains	Slight Hb. reduction
19	8 days	O. U.	5 days	3 days	5	None	Unimpaired	38 grains	None
20	4 days	O. U.	1 day	4 days	5	None	Unimpaired	39 grains	None
21	3 years	O. U.	4 days	1 day	3	None	Unimpaired	55 grains	None
22	15 days	O. U.	Unknown	5 days	8	Ulcer on admission	Unchanged	38 grains	None

TABLE 2.—*Sulfathiazole Treatment*

Case	Age of Patient	Eye Involved	Duration Before Admission	Apparently Cured	Days in Hospital	Corneal Involvement	Visual Results	Total Dose of Sulfathiazole	Blood Changes
1	21 days	O. U.	4 days	5 days	7	None	Unimpaired	58 grains	None
2	2 years	O. U.	6 days	4 days	5	None	Unimpaired	85 grains	None
3	15 days	O. D.	4 days	4 days	8	None	Unimpaired	26 grains	None
4	4 years	O. D.	3 days	3 days	5	None	Unimpaired	188 grains	None
5 *	12 days	O. U.	8 days	9 days	11	None	Unimpaired	64 grains	None
6	20 years	O. S.	2 days	2 days	3	None	Unimpaired	200 grains	None
7	5 days	O. D.	3 days	3 days	5	None	Unimpaired	23 grains	None
8 †	4 years	O. U.	2 days	2 days	4	None	Unimpaired	85 grains	Slight leukopenia

* Not cured after eight days' treatment; changed to sulfapyridine; well in thirty-six hours.
† Sodium sulfathiazole 5 per cent solution instilled every two hours; severe attack with rapid recovery.

18. Long, P. H., and Bliss, Eleanor A.: The Clinical and Experimental Use of Sulfanilamide, Sulfapyridine and Allied Compounds, New York, Macmillan Company, 1939, p. 230.

Besides specific chemotherapy, I use and recommend the following routine:

1. Mechanical cleansing of the conjunctival sac every four hours by irrigating with cool boric acid solution.
2. Instillation of 25 per cent mild protein silver after the irrigation.
3. Iced compresses in cases in which there is considerable edema of the eyelids and conjunctiva.
4. Discontinuance of this treatment as soon as the eye is clean clinically and the smears are negative. This occurs usually in from twenty-four to seventy-two hours. Following this, zinc sulfate, 2 grains (0.13 Gm.) per ounce (30 cc.), is instilled three or four times a day and continued for about one week after the patient leaves the hospital.

Atropine is not used unless there is corneal involvement. No scarification of the conjunctiva, external canthotomy or foreign protein injections have been necessary since sulfapyridine and sulfathiazole have been used. In a few cases in which sulfanilamide was given, the response to treatment was poor and therefore injections of milk or of typhoid vaccine were administered. The application of silver nitrate solution to the everted conjunctiva, which was formerly employed frequently, has been unnecessary since treatment with the sulfonamides has been employed.

TABLE 3.—*Comparison of Results With and Without Sulfonamides*

	Number of Cases	Average Number of Days for Cure	Average Number of Days in Hospital	Unsatisfactory Results*
Presulfonamide therapy	50	17.3	20.3	18 †
Sulfanilamide	90	5.4	8.9	8 ‡
Sulfapyridine	22	2.57	4.85	0
Sulfathiazole	8	4.0	6.0	1 §

* Visual damage from corneal ulceration, relapses and very slow clinical and bacteriologic cures are placed under this heading.

† Corneal ulceration 11 cases; delayed recovery (over three weeks) 7 cases.

‡ Corneal ulceration 1 case; delayed recovery (over three weeks) 4 cases; tolerated drug poorly 1 case; relapse 2 cases.

§ Only slightly improved on eighth day; changed to sulfapyridine.

REVIEW OF RESULTS

The success of any method of treatment of gonococcic ophthalmia should be judged by two standards:

1. The preservation of vision, which means the prevention of ulcers of the cornea, or the healing of ulceration which may have already occurred.
2. The rapidity and ease with which complete recovery occurs.

Obviously the first standard is the more essential, but the second is of great importance both from the standpoint of shortening the patient's period of disability and from that of great economic saving. Prior to use of the sulfonamides, patients were confined to the hospital for a much greater length of time. They also required much more frequent attention; for example, irrigations every fifteen or thirty minutes day and night, as were commonly employed, frequently required the entire attention of one or more special nurses. Prolongation of this over two or more weeks, as was not uncommon, obviously was very expensive. Comparison of this with modern therapy by sulfapyridine or sulfathiazole, with which the patient requires very little local treatment and leaves the hospital fully recovered in less than seven days, shows the great superiority and the economic saving obtained by the latter method.

By inspection of table 3 it is obvious that the use of sulfanilamide constitutes a distinct advance in the treatment of gonococcic infections of the eye from the point of view both of preservation of vision and of rapidity of cure. From the same points of view it is apparent that treatment with sulfapyridine is far superior to that with sulfanilamide, the average number of days required for a cure being reduced to less than one half of the number necessary for sulfanilamide. The period of hospitalization was reduced to slightly more than one half. While our experience with sulfathiazole has been too limited to permit the drawing of definite conclusions, it is felt at present that it is not as rapid in action as sulfapyridine but definitely superior to sulfanilamide. Usually it is better tolerated than sulfapyridine.

TOXIC REACTIONS AND CONTRAINDICATIONS

It is unnecessary in cases of gonococcic conjunctivitis to give enormous doses of sulfonamides. Therefore it is seldom that severe toxic reactions occur. In this series of 120 patients there was only 1 who had a severe reaction, and he was given too large an amount of the drug (initial dose 120 grains [8 Gm.] of sulfanilamide and 20 grains [1.3 Gm.] every four hours thereafter).

Nausea is rather frequent, especially from sulfapyridine, and slight or moderate cyanosis is not uncommon. These reactions usually do not necessitate discontinuance of the drugs.

Serious blood changes have not been encountered in our series. Moderate reduction in hemoglobin and red blood cells has occurred in several cases. Severe leukopenia or acute agranulocytosis has not occurred.

There have been no contraindications to systemic sulfonamide therapy in our series of cases. We believe that there are no contraindications in gonococcic conjunctivitis unless the patient gives a history of definite intolerance to a previous administration of the drugs.

SUMMARY AND CONCLUSIONS

One hundred and twenty patients with gonococcic conjunctivitis were treated with the sulfonamides.

Toxic reactions, with the exception of 1 case early in the series, were practically negligible. Nausea occurred frequently, especially with administration of sulfapyridine. Slight cyanosis was rather common. In very few cases were there any significant changes in the blood cell counts or in the hemoglobin.

There seems to be no contraindication to the systemic use of the sulfonamides except a definite history of previous intolerance to the drugs.

Sulfapyridine is amazingly effective in the treatment of gonococcic infections of the eye. Sulfathiazole is apparently somewhat less effective. Both are definitely superior to sulfanilamide. A cure may be expected within three days, as a rule, from the time sulfapyridine treatment is begun.

My limited experience with local treatment by the sulfonamides leads me to the conclusion that it does not compare favorably with the internal use of the drugs. Recently a 5 per cent solution of sodium sulfathiazole instilled locally every two hours has been tried along with the usual dose of sulfathiazole internally. Apparently it is of definite value.

Every patient with gonococcic conjunctivitis should immediately be given adequate systemic treatment with sulfapyridine or sulfathiazole.

130 Madison Avenue.

SYMPOSIUM ON MEDICAL PREPAREDNESS

The articles which follow are the remainder of a series read at the annual session of the American Medical Association in Cleveland, June 3, 1941. The other five articles in this series were published in The Journal last week.

PROCUREMENT OF MEDICAL PERSONNEL AND MATÉRIEL IN THE PRESENT EMERGENCY

JAMES C. MAGEE, M.D.
Major General, United States Army;
The Surgeon General

WASHINGTON, D. C.

I appreciate the opportunity afforded me this afternoon to express my sincere thanks for the splendid cooperation and support rendered by the Committee on Medical Preparedness of the American Medical Association in the furtherance of the national defense program and to inform you of some of our problems and the action we are taking to solve them in a proper and judicious manner.

As physicians and citizens, you have given proof of your interest in national defense. The security of our country is the paramount issue in all our lives today, and everything else must be subordinated to the accomplishment of this purpose. There must be no moral or physical hesitancy until the adequacy of our preparedness insures the national safety of our people.

MEDICAL PERSONNEL PROBLEM

Our problem is not only of securing personnel in order to furnish an adequate medical service to an unprecedented peacetime army but of training approximately 60,000 Medical Department selectees who, at the expiration of their twelve months military service, will pass to a reserve component and constitute a reservoir of trained personnel required for any emergency. We have provided for a rational utilization of medical officers in order not to disrupt civilian medical service, although in the necessary decentralization of personnel procurement some injustices may have resulted. It is our sincere purpose to avoid these to the greatest possible extent.

Our national defense program as now outlined has required in addition to the 1,230 medical officers of the Regular Army approximately 9,000 physicians for the Army, 900 for the Navy, 100 for the Public Health Service and 100 for the Veterans Administration, or a total of 10,000 in addition to present staffs. Computations for Medical Department Reserve officers requirements for the 1942 training and service program indicate that we shall need for the Army alone 9,020 Medical Corps and 1,992 Dental Corps reserve officers. These figures are based on an army of 1,400,000. This reduction in available doctors for civilian practice together with the increased demand for medical care in the field of industrial medicine due to the growth of communities throughout the country, through the establishment of new defense industries and their associated health problems imposes a regrettable burden on all of you. This will produce an increased demand of an estimated 10 per cent of physicians (5 per cent for the withdrawal from civilian practice for our armed forces and another 5 per cent for the increased demands enumerated in industrial medicine).

The fact that our supply of medical men is not distributed in accordance with population, thus creating shortages in one area and overages in another, has added to our problem. The 5,000 medical graduates currently entering the profession each year represent the only source of supply for our future civilian and military needs. When it is realized that approximately 18 per cent of the nation's physicians are 65 years of age or older, that 3,800 are lost to the profession each year and that experience has shown that only from 60 to 65 per cent of medical graduates are physically and otherwise qualified for military service, the supply is inadequate. Except for those who have agreed to serve an additional year prior to detail to foreign service, our Medical Reserve officers are not continued on extended active duty for a period longer than twelve consecutive months without their consent. If an estimated 50 per cent terminate their service each year, it will mean that we need 4,500 Medical Reserve officers for our yearly requirements as replacements.

From these figures it is apparent that there is an over-all and national shortage of physicians both for civilian needs and for our armed forces. We have proved our point with those concerned with manpower that no replacement is available for the medical student withdrawn from school and that inducting any of those students for service in a nonprofessional capacity only aggravates our shortage. Since the internship is an essential part of the medical education, the situation also holds for this necessary additional training.

To meet these problems we have attempted to rationalize our policies to fit our requirements, keeping in mind the national picture and at the same time to mitigate as far as possible the individual hardships of those called to serve in the Army.

Our efforts to this end have been unceasing, and on May 2 the Selective Service System recommended to all its state directors that no student or intern who gives reasonable promise of becoming an acceptable medical doctor should be called to military service prior to attaining that status. On the recommendation of my office, the Secretary of War published instructions that a Medical Reserve officer is not considered eligible for extended active duty until he shall have completed at least one year postgraduate hospital internship. Deferment of such duty beyond that time will depend on the current requirement for medical officers. Because of our continuing training program it may be necessary to postpone longer internships, residencies and postgraduate work until the obligation of military training has been discharged.

An opportunity has been provided for all senior students of American schools approved by the Council on Medical Education and Hospitals of the American Medical Association on successful completion of the required four year course to gain commissions as first lieutenants in the Medical Corps Reserves, whether or not a degree of doctor of medicine is conferred at that time or withheld until after an additional period of practical experience. Consequently even though a local

board places an intern in class I-A by reason of determining that he can be spared from the community, such intern may by proper reclassification and on accepting an appointment in the Medical Corps Reserve be permitted by the War Department to complete his first year's internship. In this connection, if applications are not properly submitted for appointment and the applicant is selected for induction, considerable time may elapse before the appointment may be accomplished. To assist the individual officer in closing out his personal affairs, assignment groups have been ordered by the War Department to anticipate the effective date of the order by at least a month to provide adequate notice between the date of receipt of their orders and the date on which they enter on active duty.

In event of mobilization necessitating an immediate material increase in the Medical Corps, we will have available the names of applicants for appointment therein who are eligible, qualified, classified and available for immediate active duty without undue disruption of civilian medical service. This has been accomplished as a result of the nationwide survey of the medical profession conducted by the Committee on Medical Preparedness of the American Medical Association, a contribution of incalculable value both for civilian medical service and for our military requirements. Although the procurement of medical personnel constitutes a real problem, if we make judicious use of our pool of doctors and are successful in convincing the medical profession that a real emergency does in fact exist I am sure we can make adequate provision for both our civilian and military needs if our medical students are permitted to continue their studies without interruption.

PROCUREMENT OF MATÉRIEL

The building of our own defenses to adequacy and supplying the many and varied requirements of other democracies is a task of sufficient magnitude to dominate all other activities.

The Medical Department is properly charged with the procurement and distribution of medical supplies for the entire Army. These supplies may be placed in two general classes: first, those items necessary for the routine care of the sick similar to those utilized in civilian medical and hospital practice, commercial in nature, and whose rate of consumption varies directly with the size of the Army, and, second, field equipment consisting largely of items and assemblies adapted primarily for emergency treatment and evacuation of battle casualties, largely noncommercial in nature but whose rate of consumption varies from a negligible quantity in peace time to astronomical proportions during actual combat.

In 1924, in compliance with the National Defense Act, there was established a division of the War Department called Procurement Planning. For the Medical Department, centralized control of this function is directed by the Finance and Supply Division. Planning initiated at this time has been a continuing process, because of constant revisions necessitated by changes in type of equipment, revisions in War Department mobilization plans and in the productive capacity of the various manufacturers. The detailed work has actually been performed under seven procurement planning districts in the field located according to the center of industrial population, and officers from the Medical Department are trained in the Army Industrial College and in the various sections of the Supply Division for these duties.

The proper study of the supply requirements of the Medical Department and of industry's ability to meet such requirements in a national emergency is known as procurement planning and has been of inestimable value in providing a sound basis for the procurement of the necessary supplies in our present expansion program.

Representatives of my office have maintained contact with industry and have surveyed all the most important plants now producing medical supplies. Through these surveys we have become better enabled to standardize our equipment, write more satisfactory specifications and in general obtain a more complete understanding of industry's production problems.

For several years the Medical Department has had basic equipment lists covering supplies to be packed for field assemblies such as battalion medical sections and medical regiments. Lists have also been prepared during the past year for station hospitals of from twenty-five to two thousand bed capacity, thus simplifying paper work and time for assembly and issue. We have of necessity made industrialists of certain medical officers in order that they might more correctly speak the language of industry and in time of emergency assist in the elimination of those processes which curtail production. Our surveys of industry have convinced us that there is adequate production capacity in our country for the fabrication of our needs.

We have heard much of America's mass production and are convinced that our industry is capable of producing anything under the sun, regardless of its size, shape or function. We have so convinced ourselves of its infallibility that we have relaxed into a sense of security which is not entirely warranted. The national press should have made us conscious by now of the time lag required for fabricating machine tools for production, the difficulties connected with raw and contributing material requirements, and those many problems incident to the training of the necessary industrial workers. Drugs and chemicals are in many instances wholly or partially dependent on imports. Studies have been made relative to the use of substitutes, where possible, and in other instances stock piles have been recommended and now exist in opium, mercury and quinine. The Department of Agriculture is also introducing and cultivating some of the suitable botanicals domestically.

Skilled workers and apprentices are being trained as rapidly as possible through the efforts of the superagencies established by the President under the National Defense Act in cooperation with my office.

The difficulty encountered in the manufacturing of surgical dressings is due to the considerable needs of the British government and the American Red Cross, added to the increased requirements of our Army and Navy. There are sufficient looms for the manufacture of the gray goods, but owing to the fact that these same looms may be used in the manufacturing of more costly and lucrative textiles the production has not reached the adequacy we desire. Bleachery capacity has also been one of the "bottlenecks" adversely affecting this production.

The raw materials which are at the present controlled by the Office of Production Management because of their potential scarcity consist of such items as aluminum, nickel, brass and rubber and a few others. Probably the greatest difficulty that has confronted us in our various matériel problems has been in the procurement of the so-called hard or stainless steel surgical instruments.

In 1915-1916 the surgical instrument industry first became prominent in the United States as the result of our inability to secure further German imports. During the World War this was a thriving business in our country, but following the cessation of hostilities the industry dwindled to about three concerns. Again the German, French, Swedish and English instruments had preference in this country, owing to the price differential. We have demonstrated unquestionably that we can manufacture as good an instrument as any country, but we have not been able to furnish real competition in this field, owing to the cost of materials and labor. Through the encouragement of my office, we are today manufacturing certain surgical instruments of high quality in some of our leading silverware concerns.

Many problems have arisen in the manufacture of sterilizers and roentgen ray equipment because of the present shortage of basic materials and the necessity for priority ratings.

I should like to stress the point here that, although preference ratings have been granted on certain items essential to the Medical Department in its defense program, my office has gone on record as requesting the extension of priorities on all items required in the maintenance of our national health and the proper treatment of the sick and injured. Favorable results are shown in the rulings on aluminum and nickel whereby items required for the health of the nation have been given a moderately high preference rating.

The actual work of procurement and distribution of supplies, although controlled by the Office of the Surgeon General, is decentralized to medical depots where purchases are made and where supplies are stored and issued to the using agencies. At the present time the Medical Department has seven active depots in the United States located at New York, St. Louis, San Antonio, San Francisco, Chicago, Savannah and Toledo, and also three reserve depots. It has been necessary to lease additional space for the first four depots named, and over one and one-half million square feet of space was leased to activate the last three depots.

I would stress these points, namely, that although many problems in procurement of matériel have arisen, I am sure that, when industry hits its stride, production will be ample for our needs as well as for those of the democracies we are aiding; that proper planning has mitigated our procurement difficulties to a considerable degree, and of my assurance to you that my office through its procurement planning section will always give every consideration to civilian medical matériel requirements.

CONCLUSION

Your realization and thorough understanding of the magnitude of our problem and the tangible expression of your desire to see it accomplished as evidenced by the manner in which you have met its challenge is most encouraging. There is much work yet to be done, however, and I have specified some of our problems. A continuation of the same commendable effort and cooperation already contributed by you will be of incalculable value to our nation and will once again assure the people that the medical profession now stands, as always, in the forefront of the country's defenders.

Office of the Surgeon General.

VENEREAL DISEASES AND NATIONAL DEFENSE

JOSEPH EARLE MOORE, M.D.
BALTIMORE

Venereal disease has been the concern of the United States Army and Navy at least since 1778. In this year Congress provided that any officer should be fined $10 and any enlisted man $4 who should be admitted to a hospital with such a disease. Aside from the purely medical measures of treatment of infected personnel, various other control steps have since been taken, including (1) a continuation of the policy of punishment for infection, differing in severity from time to time but still including (by acts of Congress, 1912 and 1914 and 107th Article of War) loss of pay and loss of time for disease acquired "as a result of misconduct," [1] (2) periodic physical inspection of personnel (1899), (3) the provision of recreational facilities (1909), (4) chemical prophylaxis (1909) and later mechanical prophylaxis, (5) educational measures (1909), (6) official recognition of responsibility of unit commanders for high venereal disease incidence (1923), (7) the routine serologic testing for syphilis of all draftees and other personnel (1940), and (8) adherence to an agreement between the War and Navy Departments, the Federal Security Agency and state health departments particularly affirming the value of the epidemiologic approach to case finding, and of repression of prostitution (1940).

VENEREAL DISEASE INCIDENCE IN THE ARMED FORCES IN WAR AND PEACE

Its Relation to Medical Organization.—The data covering venereal disease incidence in the United States Army cover four wars.[2] During the first three of these, the Mexican, Civil and Spanish wars, and in the years between them, no special measures for venereal disease control were undertaken. In each of them, the annual incidence rate per thousand of strength approximately doubled, to fall back after demobilization to an average of about 80 per thousand annually. After the Spanish-American War the peace time drop was delayed about ten years and was to a somewhat higher level, about 90 to 100 per thousand.

In World War I, on the contrary, specially trained venereal disease control officers were called into Army service in large numbers. In the American Expeditionary Force in France no less than two hundred and forty-six officers were assigned to this duty, among whom were six colonels, seven lieutenant colonels, twenty-four majors, eighty-five captains and one hundred and twenty-four first lieutenants. Not all of them were on duty at any one time, but there was a rough proportion of one military venereal disease control officer to each ten thousand of troop strength. The organization and work of this group, brought into being by the energy and vision of Major (later Col.) Hugh H. Young, is described monographically by Walker [3] and

From the Syphilis Division of the Medical Clinic, the Johns Hopkins University and Hospital.

1. Dunham, G. C.: Venereal Diseases in the American Army, Army M. Bull., July 15, 1923, p. 152.
2. Report of the Surgeon General of the Army, 1938.
3. Walker, George: Venereal Disease in the American Expeditionary Forces, Baltimore, Medical Standard Book Company, 1922.

in racy autobiographical fashion by Young himself.[4] Less completely documented details are available as to the similar but apparently more loosely knit venereal disease control organization in the Army in the continental United States, but from the memories of participants it appears that at least two hundred and forty specially trained officers were so assigned, in the Surgeon General's Office, in each of the thirty-two large camps and in cooperation with the civilian authorities, mainly in law enforcement activities.

This concentration of venereal disease control effort was productive of a result not attained in any previous war. The incidence rate rose briefly from its average prewar level of 90 to about 110 per thousand; but thereafter, and actually during the course of the war, it fell to about 60. Instead of doubling under wartime conditions, as always previously, it nearly halved.

In the Navy too the incidence rate fell during the three years of the World War period from its previous ten year average of about 150 per thousand to an average of 90.[5]

Even this spectacular result was, however, a relative achievement only. During the thirty-three month period of World War I, April 1, 1917-Dec. 31, 1919, there were reported in the United States Army 483,717 [6] and in the Navy 57,146 cases of freshly acquired or freshly discovered venereal disease. These accounted in the two services for 7,492,610 lost man days, the equivalent of the absence from duty of 21,000 men for one full year.[5] At least 11 per cent of the mean annual strength of both services were infected at enlistment or became so during their comparatively short period of service. The records are admittedly incomplete, and the 540,863 known cases in the two services represent the minimum, not the actual, incidence.

After World War I the venereal disease control groups of specially trained officers were demobilized. Again venereal disease became the concern of every medical officer in general, and therefore of nobody in particular. Nevertheless the rate in the Army continued to fall until in 1939 it had reached the all time low of about 31 per thousand, and in the Navy, following a preliminary rise after the war, it had fallen in 1939 to 85 per thousand. However, there is reason to believe that the current low premobilization rates are at least in part artificial and in part a reflection of some decline in the civil population.

LOW VENEREAL DISEASE RATES IN THE ARMED FORCES

Their Relation to Punitive Measures.—The probable artificiality of venereal disease incidence rates in the Army and Navy, not only now but for a century and a half, is a troublesome problem. The difficulty is not so much from the biostatistical point of view, since this is perhaps unimportant in that trends of infection are determined with as much validity from incomplete as from complete data, provided the fault accounting for incompleteness remains constant. Much more important are the possible reasons accounting for the artificiality, if it exists, and their impact on the further spread of disease. There is evidence that punishment of an infected soldier or sailor, whether by loss of pay for loss of time or by other more drastic means, leads to concealment of disease from military or naval sources of treatment and to self treatment, drugstore treatment or treatment (often inadequate) by civilian physicians. Disciplinary action against unit commanders because high venereal disease rates may be interpreted as lax discipline in their units may lead to connivance by these commanders at concealment of infection in enlisted personnel or even insistence on it. The interpretation of infection as "due to misconduct" overlooks the fact that many, perhaps the majority, of soldiers and sailors are "guilty" of the same misconduct but are not punished or punishable because fortunate enough to escape infection. In other words, the Army and Navy are still chargeable with the point of view which stigmatizes venereal infections as sins rather than as diseases, a point of view which civilian experience has repeatedly shown promotes concealment of infection and therefore its continued and undercover spread.

Military and naval personnel acquire venereal disease, obviously, from the civilian population, and the Army and Navy are therefore thoroughly justified in insistence on heightened effort at venereal disease control among civilians. But soldiers and sailors also spread these diseases to civilians, and the public is likewise justified in asking that the Army and Navy take vigorous action also. The armed forces may profit by the experience of society in general and by the adoption of the principle that venereal disease is not controlled by punishment. It is desirable, therefore, that disciplinary measures be abolished, by regulation where possible, by act of Congress where necessary.

Likewise contributing to concealment of disease is the long-standing policy in both the Army and the Navy of requiring hospitalization for fresh uncomplicated infections with syphilis and gonorrhea. The period of hospital confinement varies at the discretion of the medical officer but is rarely less than ten days and may exceed several months. This procedure is unnecessary for medical reasons, since the patient is not usually ill either from his disease or as a result of treatment for it, since quarantine for the protection of others may be so brief as to be measured in hours or at most a few days, and since technically these diseases are as easily treated on an ambulatory as on a hospitalized basis. In both services, and especially in the Navy, there are important administrative considerations which demand that the policy be continued for some, perhaps for most, infected personnel. Where it is essential, the period of hospital stay might profitably be reduced to the barest possible minimum in order to conserve man power, to minimize expense to the services and thus indirectly to the taxpayer, and to minimize the punitive feature of loss of pay for loss of time to the patient. In this connection, furthermore, an intangible but none the less real punitive measure is added if infected personnel are stigmatized among their comrades by segregation in special "venereal wards." A compromise between the exigencies of the services and the public health objection that the policy of hospitalization promotes concealment of disease and therefore its spread might be furthered if such patients were managed without segregation and if the length of hospital stay for the average uncomplicated case was limited to ten days.

4. Young, H. H.: Hugh Young, A Surgeon's Autobiography, New York, Harcourt Brace & Co., 1941.

5. Stephenson, C. S.: The Naval Medical Officer's Public Health Activity with Special Reference to National Defense, South. M. J. **34**: 90 (Jan.) 1941.

6. The Medical Department of the United States Army in the World War **9**: 263, 1928.

This is a time period adequate to cure the majority of cases of gonorrhea and to initiate treatment for syphilis and to render it noninfectious. Whenever local circumstances permit, the administration of treatment on an ambulatory basis, the patient remaining on active duty, is highly desirable, most of all for conservation of man power.

DECLINE OF VENEREAL DISEASE INCIDENCE IN THE ARMED FORCES, PERHAPS A PARTIAL EXPRESSION OF LIKE DECLINE IN THE CIVIL POPULATION

The decline in venereal disease incidence in the Army and Navy (in the former beginning in 1920 and in the latter in 1931) may reflect in part some similar decline in the civil population. This decline apparently began from twenty to twenty-five years ago but has been enormously accelerated in the past five years. It is measurable in many ways, perhaps the best of which for military purposes is the material decrease in the prevalence of syphilis in selectees in 1940-1941 as compared with its prevalence in drafted men in 1917-1918.[7]

METHODS OF VENEREAL DISEASE CONTROL IN THE CIVIL POPULATION AND THEIR APPLICABILITY TO THE ARMED FORCES

Unquestionably the greatest single factor accounting for the decline of venereal disease in the civil population is the control organization built up through the United States Public Health Service in cooperation with state and local health departments. Since 1918 the Public Health Service has had a separate Division of Venereal Diseases to which on Dec. 31, 1940 were attached three hundred and twenty persons (thirty-one commissioned medical officers, two hundred and eighty-nine noncommissioned personnel). Each of the forty-eight states and the District of Columbia has created (most of them within the past five years) within the state health department a division or subdivision of venereal disease control headed by a full time, usually specially trained venereal disease control officer with auxiliary personnel; and this example has been followed by practically every municipality in the country of five hundred thousand population or over. Exact data as to the number of persons devoting full time to venereal disease control in the civil population are not available, but it is a fair estimate that at least one hundred state and local health departments possess such divisions.

It was early recognized that the public health approach to venereal disease control demanded, on the one hand, a thorough knowledge of the principles of public health and an adequate working knowledge of the clinical manifestations of venereal disease. These two complementary points of view are essential because of the fact that, unlike all other communicable diseases, the control of this particular group depends on the cornerstone of treatment of the individually infected person plus the equally fundamental public health principles of case finding and case holding. It was necessary to create such a group of specially trained physicians from the ground up, a task which is still proceeding.

In their creation and development, special public health technics have been worked out, now so elaborate as to justify monographic presentation (by Nelson[8]). These technics, together with the enormous expansion of civilian treatment facilities, are the factors which have brought about the decline of venereal disease in the population as a whole.

In other words, the civil public health authority has finally learned its lesson: that as long as venereal disease control is the job of every public health officer and of every civilian physician it is the job of nobody and results are invisible. When, on the other hand, it becomes the sole responsibility of specially trained medical and auxiliary personnel, results become apparent at once.

The Army and Navy have also given recent recognition to this point of view. Each service has now created, within the offices of its respective Surgeon General, subdivisions of venereal disease control under the divisions of preventive medicine. The immediate and pressing need of these new subdivisions is medical personnel specially trained in the public health and clinical aspects of venereal disease control. It is desirable that there be furnished, as a minimum organization, venereal disease control officers for each corps area and naval district, and for each troop, naval or marine concentration of ten thousand or more men; and, in addition, officers with clinical experience in the venereal diseases for each hospital of five hundred or more beds.

The procurement of this personnel under present mobilization conditions is one of exceptional difficulty. Adequately trained potential reserve officers in the currently acceptable age group (under 35) are mostly already employed in civilian public health departments; to call a large proportion of them into military or naval service would grossly interfere with the progress of the civilian public health programs for venereal disease control and thus adversely affect the Army and Navy themselves. To commission older civilian physicians with this or other special experience is at present difficult if not impossible. To provide special training for officers of the regular medical corps of either service is out of the question, since they are themselves urgently needed for the vital administrative and special professional duties of mobilization. To train reserve officers called to duty for only one year is wasteful and unprofitable, since too much time is required for training and too little left over for its application.

The impasse is one which must affect not only the problem of venereal disease control but other specialized medical service problems as well. The solution appears to lie in the direction of organized personnel planning between Army, Navy, Public Health Service, state and local health departments and the American Medical Association to the end that every American physician may be assigned to that position of service to his country in its grave emergency for which he is best fitted by physical and professional qualifications.

DUTIES OF THE VENEREAL DISEASE CONTROL SUBDIVISION

Given basic personnel, the duties of the Army and Navy subdivisions of venereal disease control seem clear, and their performance relatively easy. They include:

1. The procurement of professional personnel or, if they cannot be had from civilian life, and when conditions permit, the training of medical officers in venereal disease control, preferably through the use of established

7. Preliminary findings of an analysis by the U. S. Public Health Service; actual comparative figures not yet available.

8. Nelson, N. A., and Crain, Gladys L.: Syphilis, Gonorrhea and the Public Health, New York, Macmillan Company, 1938.

civilian university training centers, and the employment of such officers as clinical and public health consultants.

2. Desirable changes in administrative procedure, such as:

(*a*) The education of line officers and legislators toward the end of abolition of punitive measures for the acquisition of venereal disease as a necessary public health control measure.

(*b*) Some modification of the policy of compulsory hospitalization for uncomplicated venereal disease, or its abandonment where conditions permit; with the substitution of a system of treatment of infected personnel with their units. This change in existing procedure is calculated to decrease concealment of venereal disease, to avoid loss of manpower and to minimize expense.

(*c*) The synchronization of clinical and laboratory diagnostic and treatment procedures and records.

3. The supervision of educational measures for all officer and enlisted personnel.

4. The supervision of mechanical and chemical prophylaxis.

5. Cooperation with the United States Public Health Service and state and local health departments, especially in the epidemiologic approach to case finding methods in the civilian population.

6. Active support and encouragement of local law enforcement agencies in the vigorous repression of organized and clandestine prostitution in areas accessible to military and naval personnel.

7. Cooperation with the Chaplain's Corps Morale with units of Army and Navy, with the Joint Army and Navy Committee on Welfare and Recreation, with the American Red Cross and with civilian welfare organizations in the provision of adequate recreational facilities for military and naval personnel both within camps and cantonments and in neighboring towns and cities.

SUMMARY

The venereal diseases in the U. S. Army and Navy are still, as they always have been, a problem of the first magnitude. Except in the event of epidemics of other acute infectious diseases, they remain, as they always have remained, the major infectious disease problem which the services face. Their importance is increased, as always, under conditions of mobilization for training or for war. The high incidence of venereal disease is of military importance because of loss of manpower, of civilian public health importance because of the additional spread of these diseases to the civilian community by infected military and naval personnel, both during and after their period of service; of individual importance because of the disabilities produced by these diseases, especially syphilis, and of importance to the taxpayer because of the cost of treatment of infected personnel and of compensation for subsequent disability.

It is believed that the control of these diseases in the Army and Navy depends in the first instance on the creation of a group of medical officers with special training in clinical and public health control measures, who devote full time to their particular task, and of the direction of these officers in the application of these measures by the newly created subdivisions of venereal disease control, now established in the offices of the respective Surgeon Generals. Given this, the job can be well done. Failing this, it will be half done. Let's get on with it!

Medical Arts Building.

THE HEART IN MILITARY SERVICE

EUGENE S. KILGORE, M.D.

SAN FRANCISCO

If our last big army is to furnish the medical pattern for the present, an important group of chronic medical disabilities will be that referred to the heart. But that much of this disability is preventable is the conviction of thoughtful observers of medical service during the last war and during the long years of postwar hospitalizations and pension ratings. This is a time, therefore, in which it may be hoped that past experience, focused on today's work, will obviate much wastage of man power in the armed services and of government money in the future. Much good can be done by improved standards and due care in the medical examination of selectees, and this is receiving well merited attention. This paper, however, is concerned only with the less emphasized but equally important subject of caring for men in the services.

The real problem is not that of genuine heart disease; it is that of other things which masquerade as such. Statistical studies have been made of structural diseases of the heart, based on service and later hospital records;[1] but long experience in reviewing immense individual files from these sources and then examining the claimants concerned creates much reserve in accepting the results of such compilations. The fact is that many diagnoses of mitral insufficiency, myocarditis, angina pectoris and the like were mistakenly entered in the records and have been carried forward as grounds for disability ratings long after the passage of years and accumulating evidence should have removed any doubt about the original diagnostic errors. Thomas Lewis,[2] in reviewing the studies at Hampstead from 1914 to 1918, estimates that about five sixths of the British army diagnoses of organic heart disease were erroneous, an estimate probably not far from the truth of our own past performance. And for the practical conduct of medical service for our armed forces of the future we may safely assume that real heart disease, infrequently encountered, will usually receive adequate recognition and treatment, while other things with the superficial appearance of heart disease will require special care if we are to avoid costly mistakes of the past. These other things, the so-called functional disturbances, may be divided conveniently into those of signs and those of symptoms.

MISLEADING PHYSICAL SIGNS

Chief among the physical signs often responsible for mistaken diagnoses of cardiovascular disease are benign murmurs and arrhythmias, simple tachycardia, and temporary elevation of blood pressure from the excitement of a medical examination. Some with the last mentioned condition may be candidates for sustained hyperpiesis in later life, but they should not be regarded as abnormal without repeated observation under conditions of quiet and reassurance.

Cardiac arrhythmia in young recruits is chiefly sinus arrhythmia—alternate acceleration and retardation in heart rate, usually but not always timed with respiratory cycles. It is always benign and usually easily recognized. But at times the transitions from faster to

1. Matz, P. B.: Am. Heart J. **4**: 313 (Feb.), 455 (April) 1929; New England J. Med. **212**: 868 (May 9), 929 (May 16), 977 (May 23), 1042 (May 30), 1087 (June 6) 1935.

2. Lewis, Thomas: The Soldier's Heart and the Effort Syndrome, London, Shaw & Sons, Ltd., 1940.

slower rhythm and vice versa are very severe and abrupt, and create the impression of heart block. Premature contractions are also not uncommon in the young. They sometimes result from damage to the myocardium, especially those of atrial origin (usually recognizable by the fact that the pulse intermission is shorter than two normal intervals); but they are more often benign and should be so considered unless other evidence of heart disease can be found. They may produce but faint sounds, sometimes only a faint first sound, especially when occurring early in diastole; and if this is missed in auscultation, the compensatory pause may cause the mistaken diagnosis of heart block. In general no such diagnosis should be made in young soldiers without electrocardiographic confirmation.

A systolic murmur can be found in a considerable proportion of healthy young adults if they are examined in various postures, in different phases of respiration, before and after exercise. These functional murmurs are much more common during fevers. They are rather faint, but sometimes moderately loud, and are heard in the apical or pulmonic area. If not very loud, if not high pitched, if markedly changed by respiration and posture and if not accompanied by other signs of heart disease (especially enlargement of the heart), by deficient heart function or by a history of rheumatism or chorea, these systolic murmurs should not be regarded as pathologic. And in the case of borderline systolic murmurs—some of the louder ones, less clearly dependent on posture or respiration—the diagnosis of valvular disease, if suspected but not confirmed by other physical signs, should in general be held in abeyance until radiographic and electrocardiographic studies have been made.

MISLEADING SYMPTOMS

The other group, predominantly of symptoms, embraces chiefly the condition or conditions usually designated neurocirculatory asthenia, effort syndrome and the like. The main characteristic is that, without structural circulatory disease as explanation, the usual effects of severe exercise—dyspnea, tachycardia, perspiration, tremulousness, giddiness, heart consciousness and often precordial pain—are called forth by comparatively little exercise. Pulse and breathing are accelerated except during sleep, excessively so and with delayed deceleration after light exercise. Pain is often corroborated by the finding of precordial tenderness—an observation which should be made only when the subject's attention is diverted.

After much research there remains uncertainty about the mechanism of the disturbed function involved. Similarities to hyperthyroidism are apparent. Hyperventilation and other chemical change are discussed. Minor peculiarities in electrocardiograms are reported. But despite obscurity of mechanism, certain things of great practical value in management are well known. The disturbance is of a general nature and not a reflection of real heart disease, however much symptoms referred to the heart may predominate. Constitution is the important predisposing factor and often the only obvious one. Candidates for the effort syndrome are those with poor posture, flabby muscles, poor nutrition or marked obesity; those with tachycardia, labile blood pressure, cool, moist and bluish extremities, marked dermatographia and dripping axillas; those who have avoided strenuous athletics and sought light work; often those who eschew tobacco and alcohol, perhaps after experiencing poor tolerance, and who are given to worry and to the study and adoption of diets and other health fads. Men with such poor natural stamina may break down in ordinary military training; and then, despite the best of treatment, they are prone to continue in a state of pensioned disability, from which it is difficult or impossible ever to wean them. Others, better endowed by nature, stand vigorous training exercises but fail when adequate physical or nervous strain follows the depleting effects of infection, prolonged fatigue, insufficient food and shelter, anxiety and the like. Their disability is more often temporary because its chief causes are removable.

Often associated with the effort syndrome but also occurring without it are faintness or syncope, heightened consciousness of heart action with or without benign arrhythmia, and nonanginal precordial pain. Men of strong fiber may faint when they stand too long at attention, when they enter a medical office or rarely from pressure of the collar on the carotid sinus or from other reflex cause. Commonly there is vasodilatation and cardiac inhibition, with marked fall of blood pressure, which, however, is sufficiently mitigated in the recumbent posture. Such transitory physiologic episodes should not be confused with heart disease, hypoglycemia or other important disorder; and, if not too frequent and not associated with other evidence of unfitness, they should not be regarded as disabling.

Through introspection or suggestion it is easy for normal persons to acquire heightened perception of the ordinary beat of the heart or of the pulse in the ears or elsewhere, especially when lying on the left side—and, of course, the more so if there are ectopic beats or if the force of the heart beat is increased by too much coffee or tobacco or by simple apprehension.

And nonanginal precordial pain, a usual complaint in those with well developed effort syndrome, is not rare in others with good tolerance for exercise. It may be a diffuse dull aching or burning sensation, with or without some radiation to the arm, independent of effort or with delayed response to effort and delayed relief by rest—in contrast to the usually consistent and prompt relationships of angina. Occasionally this is due to the excessive use of tobacco. Lancinating pain is only a little less common and deserves more attention. In contrast to the constricting quality and crescendo progression of the anginal seizure, it is a sudden and usually momentary sensation described as jabbing, stabbing, grabbing or like a "catch." It may be repeated at short intervals, sometimes with each heart beat, and is usually independent of effort. The subject usually avoids deep breathing, instinctively feeling that it would aggravate the pain; and he may describe the most bizarre topographic delimitations, such as a spot of pain the size of a dime above or below the left nipple, or from there a streak of pain to the left scapula, to the upper pectoral region or horizontally or diagonally across the sternum. Radiation to the left arm is frequent. Similar lancinating pain is sometimes described in the right chest or in remote parts of the body. Like the common "stitch in the side," from which it differs little if at all except in intensity, its mechanism is unknown. But we do know that it is benign; and its only importance lies in the readiness with which its more severe manifestation is confused with angina—in the mind of the patient, and too often in that of the physician.

MANAGEMENT

In disability resulting from any form of masquerade heart disease, fear is nearly always an important factor and often the only one. It usually comes from suggestion. The medical officer, therefore, who finds a

murmur or arrhythmia or who hears the complaint of syncope, palpitation or precordial pain should be aware that he carries a responsibility comparable in importance to that involved in a delicate surgical operation. If he is sure of his ground, the task should be easy. If the heart is diseased he will frankly state the case and advise accordingly, being careful not to implant an exaggerated idea of the gravity of the condition. And if he is sure the sign or symptom in question does not mean heart disease, he will be equally frank and decided. In doing so, however, he should remember that words are often discounted and that attitude is more convincing. Reassuring statements may be nullified by merely calling an associate to listen to an interesting murmur or by cautioning the patient to be a little careful. If he needs to be careful to avoid aggravating an effort syndrome, the reason should be made clear by referring to general condition and the need for graded physical training, without the use of terms implicating the heart. Whether or not to mention the discovery of a benign murmur or arrhythmia is debatable. My own inclination is usually to do so, in a casual and reassuring manner—to safeguard against the possibility of a mental shock when some later examiner may be less accurate in his opinion or less careful in expressing it.

But when the medical officer doubts the significance of signs or symptoms the matter of preventing psychic harm is more difficult. Further examination will be needed, perhaps with roentgen rays and the electrocardiograph, and the soldier must know why. If his question, whether expressed or not, is met with evasiveness or with an obvious attempt at reassurance, the damage will probably be done. At all costs, therefore, the doctor should maintain an attitude of frankness. If he believes the idea of heart disease has not yet been implanted, he may give more apparent attention to other parts of the examination and then refer the man for survey of his general physical condition, while privately conveying the question of heart disease to the consultant. And the consultant, of course, should not be in a ward or on a board stigmatized with the word "heart." If, on the other hand, attention has already been fixed on the heart, the man may be referred for diagnostic study "to make perfectly sure the heart is normal"—an assumption certainly harmless and usually well justified when the examiner is in doubt.

Beyond this initial psychologic prophylaxis, similar precautions should be carried through—by the consultants for men who are referred for further study, and by the medical officers with troops for men with milder degrees of disability who are retained in their outfits or who may be assembled in convalescent camps. These camps, removed from hospital atmosphere and devoted to the reconstruction of weakened men, were inaugurated near the close of the last war. Their work was promising and should receive renewed consideration.

In cooperation with line officers, regimental surgeons can do much to minimize the incidence of the effort syndrome by attention to the many details of nourishment, rest, warmth, and adequate time for convalescence from infection, and by tempering the early physical training of recruits, while endeavoring to discover the susceptible ones and guide them into work which they can stand before serious breakdowns occur. Physical training should aim at developing in each soldier the maximum strength for which nature has designed him, while restraining him from tasks foredoomed to failure and threatening wastage of capacity.

For this purpose the gaging of fitness is essential, but auscultation of the heart and blood pressure measurements should largely give way to simple but searching observation of the general appearance and behavior of men during and after exercise. For the latter will not only cover more ground in a hurry; it is reliable and it is free from the psychologically dangerous atmosphere of doctoring. When the wouldbe athlete is ordered to lighter training by his coach, his thoughts are all in terms of physical culture, and no harm is done. But if the same man is so ordered by a doctor after a cardiovascular examination, he has a good chance of thinking in terms of pathology.

We may learn much of value from the methods and especially the manner of the athletic coach. Without stethoscope, sphygmomanometer or electrocardiograph, but with a trained eye, he has done good work. He did so before the advent of medical examinations for athletic aspirants; it would be hard to show that even then his guidance was harmful; and—let us physicians never forget—his record is not stained by the creation of masquerade heart disease.

490 Post Street.

THE ROLE OF PSYCHIATRY IN NATIONAL DEFENSE

FRANKLIN G. EBAUGH, M.D.
DENVER

The current emergency presents a great opportunity for psychiatry. Enormous preparations are under way in armies, military, industrial and civilian. Each group must be reached and helped by psychiatry to an understanding of the imperative necessity of diminishing and even relinquishing its right in order to save the democratic structure, ideologically, socially and culturally. Psychiatry as a medical science must preserve and heighten morale during the trying times of sacrifice.

The role of psychiatry in national defense can be discussed from several points of view: (1) present status of psychiatric preparedness; (2) utilization of methods of psychiatry for the peace time conscript army, the significance of morale; (3) psychiatry in industrial mobilization and civilian mental health services; (4) adequate care of psychiatric casualties during peace and war; (5) disability and compensation problems.

PRESENT STATUS OF PSYCHIATRIC PREPAREDNESS

Psychiatry is better prepared now than before the last World War to meet in a constructive manner the numerous problems of national defense. For psychiatry has developed new technics and has acquired more experience through studying the varying problems of interpersonal relationships. In order to be helpful in the present mass emergency, psychiatry needs only to enlarge its perspective and lengthen its vistas.

Psychiatrists composed the first medical specialty group that mobilized its personnel and offered its services to the armed forces of our country. This action was taken by the council of the American Psychiatric Association in May 1939 when it instructed its president to appoint a military mobilization committee to care for possible emergency developments and to confer with representatives of the Surgeon Generals of the Army, Navy and the Public Health Services. The committee,

Professor of Psychiatry, University of Colorado School of Medicine; Director, Colorado Psychopathic Hospital; Member of the Committee on Neuropsychiatry and Chairman of the Subcommittee on Psychiatry of the National Research Council.

under the chairmanship of Dr. Harry Steckel, found that the Navy would require a minimum of one hundred and fifty experienced psychiatrists, while the Army needed at least one psychiatrist to every five thousand troops; that is, for an army of one million, two hundred psychiatrists would be required. One feels, however, that such estimates are too low if real psychiatric needs are met. It was learned at that time that comparatively few adequately trained psychiatrists could be counted among the medical personnel of either the Navy or the Army. A survey of existing trained civilian psychiatrists available for either of the services was sent to all members of the association as well as to all nonmembers who were listed by the American Medical Association as specializing in psychiatry and neurology. The satisfactory response to the questionnaire revealed that five hundred and thirty-seven members and three hundred and six nonmembers would be available for the armed forces, while four hundred and fifty-one members and two hundred and fifty-five nonmembers, because of age, physical reasons or other factors, were not available for active duty but indicated a willingness to serve on a part time basis on the home front. It would appear from this report that there is available an ample supply of trained psychiatrists for an army of four million men.

On the passage of the Selective Service Act, Steckel's committee as well as other interested groups, such as the Southern Psychiatric Association through Dr. Winfred Overholser, and the William A. White Psychiatric Foundation through Dr. Harry Stack Sullivan, its president, made contact with the Selective Service system, drawing to its attention the need for eliminating so-called psychiatric risks. Director Dykstra immediately recognized the wisdom of this important step and set up a neuropsychiatric advisory committee to work with him along these lines. Since October 1940 Dr. Sullivan has spent practically all his time at national headquarters as psychiatric adviser to the medical division of Selective Service. In a memorandum for Medical Advisory Board and Army Induction Board psychiatrists, Sullivan stated:

> In the urgent interest of promoting efficient and more uniform psychiatric classification of registrants called for medical examination and with a view of preventing public misunderstanding and damage to the adaptive capabilities of registrants found psychiatrically unstable for military training, the director has authorized the holding of a series of two day seminars in various centers of population. . . . Physicians who are serving as medical examiners to local boards are not always clear about the importance of mental and personality factors in establishing suitability for induction into military service. There are those who do not realize that some of the registrants who are physically healthy should nonetheless be referred to the psychiatrist on the medical advisory board for examination. Many uninformed members of the community harbor the belief that mentally defective or disordered persons who are not doing well at home should be sent to the army to "make men of them." That this is a grievous error has been most amply demonstrated by the World War and subsequent experiences.

At the 1940 annual meeting of the American Medical Association a Committee on Medical Preparedness was organized for the purpose of preparing an index of all available medical personnel. The card index as prepared by the Steckel committee was offered to the American Medical Association committee for whatever use it might deem desirable. The National Research Council has been called on by the Surgeon General of each service for advice in the present emergency. In order to cover the neuropsychiatric aspects of the advisory work of the National Research Council a Committee on Neuropsychiatry headed by Dr. Overholser was set up because of the many ramifications of psychiatry in the defense program. Subcommittees had been organized to undertake the different activities required of the committee as a whole. Four subcommittees have been organized, each for a specific purpose: (1) Subcommittee on Personnel and Training. (2) Subcommittee on Neurology, (3) Subcommittee on Psychiatry, (4) Subcommittee on Neuroses.

Other organizations, such as mental hygiene societies, have mobilized their resources in aiding draft boards to supply pertinent data concerning personality disorders and the previous performances of each individual. The New York State Committee for Mental Hygiene has been a leader in this noteworthy development.

It is well known that every young man who is physically able may not be emotionally equipped to stand the strain of army life, especially under war conditions. Many individuals who do quite well in a civil life in an accustomed job and familiar circumstances are prone to mental disorder under the kind of stress which army life places on unstable persons. The human and economic consequences of breakdown in the military services are tragically revealed by the results of our previous participation in war—a multitude of mental and nervous casualties which even today fill half the beds in our veterans' hospitals at tremendous cost to the taxpayers. In 1940, according to Cooley, there were 68,727 mentally disabled beneficiaries to whom the government made compensation awards of $41,889,360 during that single year. In 1923 to 1940 the government paid out $641,857,704 in compensation plus $282,679,909 for hospitalization, making a total bill of $924,537,613 for the care of mental and nervous cases during the seventeen year period. Of the ninety-one facilities provided by the government for veterans in the United States, twenty-eight are for mental cases, and of the 60,000 cases of all types of disability under hospital care 33,000 were in mental hospitals on June 30, 1940. At the present time there are plans for new construction as well as for enlargement of these existing hospitals to take care of a potential load of four million persons discharged from war time and peace time enlistments.

The recognition of nervous and mental disease, of psychopathic types of personality as well as the mentally deficient is therefore of extreme military, economic and social importance. While many physical disabilities and defects can be improved or cured during military training, the experience in the last war showed that this is not the case with mental and nervous diseases. Psychiatric work in the army must be primarily and essentially diagnostic and preventive. Its practical therapeutic usefulness consists in the recognition of impending disaster before it actually occurs.

The task of building and training a huge national army is a formidable one. Many problems are inherent in the Selective Service program, which contemplates recruiting over six million men out of a total of some seventeen million registrants. Never before, though, have we had the opportunity to examine such a large number of men. From these examinations we should be able to draw valuable information as to the health of our nation's youth.

The psychiatrist is more interested in the quality rather than the number of men, but army regulations for mobilization show more interest in throwing together a huge army for the emergency than in training a good

army. Conflict thereby exists between the two philosophies, the one of weeding out the candidate who is lacking in vocational aptitudes of the army and the other getting in all the men possible. Ideally speaking, as Sullivan puts it, "We are not sorting out nuts, queer sticks, and so on, but sorting in those fit for military life." Being emotionally unsuited for military service is no reflection on those not accepted in the draft. They should not be stigmatized any more than exclusion for physical reasons, since such persons may contribute much to the national defense in a civilian capacity. Bowman looks on the work of the psychiatrist as a process of selection according to vocational aptitude and suggests as an answer to the problem of stigma of rejection the notation "This man not accepted because he does not have the aptitude for military service."

The rejection of any large number of potential candidates to the military service of our government must raise a question as to the mental health of the nation. It is time that each community realize that within its own group there is a certain incidence of morbidity from a mental standpoint the same as there is a certain incidence of morbidity from a physical standpoint. Communities must be taught how to cope with the former problem. Not only will the psychiatrist be called on to weed out those individuals without military aptitude, but they will likewise be called on to do something for these individuals so disqualified. Work in this area is being lost sight of because of the present emergency.

No matter how thorough the physical and mental examinations are for the draftee, we cannot expect to eliminate all physical and mental risks. Certain numbers of draftees will elude the finest screening possible. It therefore becomes a responsibility on the commissioned and noncommissioned officers to aid in the prevention, early detection and proper treatment of personality disorders in the personnel of the army. In order to fulfil these aims it is essential that the company officers closely collaborate and cooperate with the medical officers in viewing and interpreting the behavior of the man and have a knowledge of a few common indications of the imminence or actual existence of possible nervous and mental disorders as they may occur in the man. One of the subcommittees of the National Research Council Committee on Neuropsychiatry has been active in the preparation of a brochure which we hope will be distributed to the line officers as well as the medical personnel service corps.

Close psychiatric supervision should continue after the draftee is mustered into the army. One of the most important psychiatric aspects will be the maintenance of good morale, which has been defined by Chisholm as "that emotional state of mind in which soldiers can most effectively perform all the military duties. It is as important as armament and equipment and without good morale an unefficient army exists." The state of good morale can be developed if both men and officers pay attention to definite psychiatric principles. The most important and difficult task is to change the soldier's attitude. A definite emotional orientation must be established, an attitude of mutual cooperation, support and confidence must replace the self-seeking, self-protective point of view which is so commonly found in our citizens.

PSYCHIATRY IN INDUSTRIAL MOBILIZATION AND CIVILIAN MENTAL HEALTH SERVICES

If the task of industrial production is to keep pace with military consumption, it is very important that the mental health of industrial workers be as competent as that of our military services. Industrial workers, in a certain sense, must pass many of the same tests as imposed on the draftees. In the final analysis the current mobilization deals with all phases of life, and no one group can escape inspection of the psychiatrist.

In the industrial mobilization it will be important to eliminate the crank, the eccentric and the saboteur. It is likewise important that at another level the inefficient worker be examined for the sole purpose of trying to increase his efficiency through either direct psychiatric treatment or possible transfer to another department. The reasons for the absentees should be investigated and efforts made to decrease the number of days lost because of sickness.

As important as industrial mobilization is the conservation of civilian mental health. Both the Selective Service and industrial mobilization will bring to light large numbers of unstable persons who will present problems of rehabilitation. Hence it becomes highly important to maintain and improve standards of our mental hospitals, clinics and other civilian mental health services whose efficiency will be threatened by progressive induction of professional personnel into military service. These institutions must be maintained for the care of those to be rehabilitated. Of paramount importance in the present crisis is the maintenance of morale now threatened by the doubts and fears engendered by the swiftly changing developments in Europe and the hesitancy as to what America's course should be. We are exposed to sinister psychologic forces of one kind or another that are inducing deep feelings of insecurity, mental and emotional conflict and other unhealthy states of mind that militate against national unity and stop discipline and resolute and constructive action in the face of common danger. Public opinion is confused and torn between the opposing propagandas of conflicting groups. Anxiety grows with each new conquest by the totalitarians, defeatism is mistaken for realism, and a mass "blitzkrieg" neurosis threatens to paralyze the national will to action.

Enemy propaganda is producing its effects here as in other European countries. In a renewal of the psychologic experience in the present conflict Cameron notes the baleful influence of insecurity and other types of reaction in times of stress on the welfare of national groups. "States of insecurity," he says, "have been particularly prominent in the present period of warfare. The reason for this must be sought at least in part in the type of war which is being waged and in the use which is being made of psychological weapons. When there is marked insecurity, considerable falling off in production results, and the national group is often forced into attitudes of defense. These attitudes in turn lead to a lack of initiative, to a search for means of protection and escape, a secret fear of overestimation of the enemy and to defeatism rather than to a confident determination to achieve victory."

ADEQUATE CARE OF PSYCHIATRIC CASUALTIES DURING PEACE AND WAR

The first functions of psychiatric hospital facilities in United States camp areas will be for the examination and observation of recruits referred by the division psychiatrist for those who break down early during the period of mobilization and training, and later for the general mental health needs of the various commands. There should be a small psychiatric unit, approximately thirty psychiatric beds to every thousand medical beds in the base hospital. These would be only for temporary

care, since it is understood that the mentally ill are to be discharged as quickly as possible. These centers are to serve mainly as clearing centers for emergency care only. Larger psychiatric services for longer periods of treatment should be provided in connection with army general hospitals at or near the center of the larger troop concentrations. Only a few of these will be needed for purposes of mobilization and training. In the event of hostilities, more will be needed for mental patients returned home from combat areas. These small psychiatric units are being established at the present time.

DISABILITY AND COMPENSATION PROBLEMS

The problems inherent in mental disabilities and compensation problems will be lessened if the psychiatric program dealing with the induction of the draftee and his training in the service corps has been successful. By this method the mentally unfit will have been detected before acceptance for service, and those who develop mental difficulties later will have been dealt with through the general and base army hospitals, which should ideally lessen the problem of disability and compensation.

Treatment procedures should be such as to prevent serious development of incipient mental disorders and to condition the mentally ill for early return to mental health in civilian life, as against making them candidates for prolonged custodial care. The problem of discharging and caring for the mentally disabled will be greatly simplified at this time by the existence of the veterans' hospitals, which we did not have at the end of the last war, when the great majority of mental cases had to be farmed out to state hospitals under contract and at government expense until the veterans' hospitals were built. The hospitals operated by the Public Health Service were few and grossly inadequate to meet the large case loads of returned soldiers.

The veterans' facilities will have to be enlarged, since at the present time provisions are based on the expectations of over four million persons discharged from military services in connection with previous wars. It is obvious that another new army of six million or more men will create new demands, which the Veterans' Administration is planning to meet. Because of the strain placed on Veterans' Administration facilities it behooves us, first, to "exclude to the hilt" potential psychiatric risks from military service and, second, to make provisions for treatment in the army hospitals that will eventually clear up as many cases as possible—especially the neurotic conditions in their maladjustment by war service—and discourage invalidism and compensation neurosis.

I cannot discuss all the implications of the compensation problem but should like to comment on one special phase of the problem. Campbell has pointed out that compensation in psychoneurotic disorders is a more difficult problem than compensation in other disorders, for psychiatric symptoms represent one aspect of the behavior of the individual, behavior determined not only by conscious purposes and ideas but also by unconscious motivations. The behavior of an individual can seldom be attributed to a single factor but has to be understood in the setting of a complex system of forces. It is a little dangerous to pick out one factor such as the influence of compensation and to discuss it in isolation from the other factors involved. It is well to keep in mind the fact that in peace time and in cases in which there is no question of monetary compensation, cases of psychoneurosis may be refractory to treatment and may persist for years. There are other gains from the psychoneurosis than a monetary gain.

It is obvious that there are difficulties in relation to the attempted solution of the problem of compensation in the psychoneurotic by means of lump sum payment. As a matter of fact there is probably no solution for the problem of the psychoneurotic veteran, but there is great need for efficient prevention and treatment through the wider dissemination of knowledge of the significance of these disorders throughout the forces and throughout the community at large, and through the recognition by the medical profession of the principles involved in the treatment of the psychoneurotic whether they are civilians or veterans.

There is a likelihood that the government will continue to be as liberal in its rewards to disabled ex-soldiers with the new army as before. It is therefore highly important that those without military aptitude in the present draft be eliminated rather than accepted for military service. It is possible that the burden of compensation for "service connected disabilities" resulting from a new war may become so great as to cause a reaction away from the generous provisions by the government in the past.

Examination of literature on preparedness [1] indicates the general acceptance of the following recommendations for prevention and treatment of personality disorders in the military service.

(*a*) Every examining board physician and individual officer should have knowledge of personality disorders and be encouraged to use this knowledge.

(*b*) All recruits and selectees should be drafted for a period of probational training of three to six months in order that the misfits, neurotic, psychopathic and psychotic can be eliminated.

(*c*) Selective Service Administration should develop a department to form a liaison between school and community agencies and other services so that educational, social and health records of the recruits and selectees can be made more easily available in evaluating the men before induction.

(*d*) Armed services should, as far as it is feasible and possible, avail themselves of the experiences and technics of industry in choosing personnel.

(*e*) There should be one psychiatrist or physician with some psychiatric knowledge on each county draft board—at least on each of the larger county draft boards.

(*f*) The public should be instructed in mental health through a wider propagation of fact than now prevails.

(*g*) Existing agencies should be made use of or new ones established to advise and assist rejectees in making better civilian adjustments and in obtaining medical and psychiatric treatment.

(*h*) Rehabilitation and vocational guidance services should be set up to reestablish disabled and discharged service men in society in a useful way.

(*i*) Such terms as "shell shock," disordered action of the heart, neurocirculatory asthenia and all others that implicate a part of the body diseased when it is only participating in a personality reaction should be eliminated from medical and psychiatric terminology.

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1. Articles include:

Cameron, D. Ewen: Psychiatric Problems of the Civilian Population During Mobilization and Warfare, unpublished material.

Campbell, Charles Macfie: Memorandum on Compensation for Psychoneurotic Disorders, unpublished material.

Chisholm, G. Brock: Good Morale—A Military Necessity, Addressed to Officers of the Canadian Army, unpublished material.

Cooley, Martin: The Economic Consequences of Inadequate Psychiatric Examinations, read at the ninety-seventh annual meeting of the American Psychiatric Association, Richmond, Va., May 4, 1941.

Steckel, Harry A.: The Organization of Psychiatry for the Emergency, read at the ninety-seventh annual meeting of the American Psychiatric Association, Richmond, Va., May 4, 1941.

Billings, Edward G.: The Literature on Military Psychiatry Since 1938, Am. J. M. Sc. **201**: 905-918 (June) 1941.

(*j*) In the combat army the psychotic individual should be immediately evacuated and sent to the appropriate hospital for intensive treatment. The psychoneurotic patient should receive intensive therapy in the zone of combat and returned to duty as soon as possible.

(*k*) Psychiatrists should be stationed at the battalion collecting station in the zone of combat.

(*l*) More or less permanent organizations should be developed to formulate means of improving case records, to evaluate the clinical and other data, to direct research and to integrate those data with new medicopsychiatric movements and projects that are of particular importance to military and civil mental health and to industrial and vocational psychiatry.

The present situation affords one of the few opportunities in our history to study and advance the cause for good mental health. We are called on to inspect the mental health of a large block of the male population of the nation. I have indicated that if the principles of psychiatry are properly utilized the military, industrial and civilian population will profit immeasurably. Morale must be maintained through the belief that every one has an important role to play in the defense of this country. Essential in the maintenance of morale is the necessity to check closely the sources of our information in order to protect ourselves from unfavorable propaganda.

There is need to study the causes of war and the nature of the people who make these wars necessary. Perhaps the same psychiatric principle should be utilized in the selection of military, diplomatic and political leaders as are necessary in the selection of the draftee.

4200 East Ninth Avenue.

THE PROBLEM OF TUBERCULOSIS IN MILITARY SERVICE

ESMOND R. LONG, M.D.
PHILADELPHIA

Active tuberculosis disqualifies for acceptance in military service. According to the standards [1] in effect in recent years physical examination to exclude tuberculosis is required of applicants for enlistment, and chest roentgenograms are obligatory in the case of every candidate for commission in the Regular Army and for extended active duty as a Reserve or National Guard officer. Roentgenologic evidence of reinfection (adult) type tuberculosis, active or inactive, or of primary (childhood) type tuberculosis of such degree as to suggest the likelihood of future clinical significance excludes a candidate from acceptance for appointment as an officer in the Regular Army and for assignment to extended active duty as a Reserve or National Guard Officer.

In the United States Navy likewise tuberculosis disqualifies for acceptance for military service. Roentgenograms are made routinely in the course of physical examination.

Nevertheless a certain amount of active tuberculosis is discovered each year in the personnel of the Army. Most of this is believed to represent disease that escaped detection at the time of examination for admission. Some may be the result of breakdown of lesions of originally supposed trivial character. The Report [2] of the Surgeon General of the Army for 1940, covering the experience of 1939, records a general hospital admission rate for the entire army of 1.8 cases per thousand men for tuberculosis and a rate of 1.0 for officers.

THE COST OF UNDIAGNOSED TUBERCULOSIS

Selective Service, introduced in the fall of 1940, made clear the necessity for a revised system of physical examination in many respects, including tuberculosis. The experience of the World War showed the grave deficiency of reliance solely on physical diagnosis for the exclusion of tuberculosis in rapid mass induction. The heavy economic burden placed on the people of the United States for insurance, compensation and medical care of tuberculous veterans of the World War was analyzed in THE JOURNAL last year by Spillman,[3] who attributed the great cost to the omission of roentgen ray examination from the preinduction examination.

The records of the Veterans Administration [4] show that, in 1921, 25,603 World War veterans with tuberculosis were admitted to hospitals under the jurisdiction of the administration. In 1940, 9,039 World War veterans were admitted. The total number of tuberculous veterans hospitalized in veterans' hospitals varied from a peak of 44,591 in 1922 to a low figure of 13,615 in 1934 and the somewhat higher figure of 16,411 in 1940. The annual cost of hospitalization varied from a maximum of $29,751,114 in 1922 to $9,552,647 in 1940. The total cost for the twenty years from 1921 to 1940 inclusive was $348,701,662. The figures are for veterans of all wars, but the Veterans Administration estimated that 95 per cent of the cost was for World War veterans. Finally, in 1940, 54,855 World War Veterans judged to have service connected tuberculosis were on the rolls of the Veterans Administration receiving compensation or pensions, which in that year were estimated to amount to $35,490,848. Spillman,[3] from a study of annual federal reports, estimated that up to October 1940 tuberculosis in veterans of the World War had cost approximately $960,000,000 in compensation, vocational training, insurance and hospitalization.

In analyzing such costs it must be recognized that not all of the expense would have been saved had tuberculosis been completely excluded from the Army. Many of the soldiers found to have tuberculosis would have been treated at public expense in the course of time in municipal, county or state institutions, at a cost comparable to that in the federally operated hospitals. However, exclusion would have reduced the heavy costs for insurance and compensation in the thousands of cases in which tuberculosis in the absence of preinduction detection was adjudged "service connected."

That a great saving might have been effected is recognized throughout the country. The fact has been emphasized repeatedly in meetings sponsored by various medical and lay groups, and the subject has been given publicity in the lay press.[5] It is now universally agreed that roentgenologic examination is far more effective in detecting early tuberculosis than physical examination, and recognized that preinduction examination of all recruits by roentgenography will avoid ultimate heavy federal costs for tuberculosis.

The principles concerned seem established in other countries, in some of which data have been placed on record. In the mobilization in Canada in the present

From the Henry Phipps Institute, University of Pennsylvania.

1. Standards of Physical Examination for Entrance into the Regular Army, National Guard and Organized Reserves, A R 40-105, War Department, Washington, D. C., Aug. 17, 1940.

2. Annual Report of the Surgeon General of the U. S. Army, 1940, Washington, United States Government Printing Office, 1941.

3. Spillman, Ramsay: The Value of Radiography in Detecting Tuberculosis in Recruits, J. A. M. A. **115**: 1371 (Oct. 19) 1940.

4. Figures from the Budget Officer of the Veterans Administration, through the courtesy of Dr. Martin J. Cooley.

5. Waring, T. B.: Editorial, Time, April 14, 1940.

war, preinduction roentgen ray examination was made routine in November 1939. Jones [6] stated that the tuberculosis cost in Canada after the last war was $150,000,000. On the expectation of great saving from the elimination from the Army of 1 to 2 per cent of all men called for military service, through roentgenologic detection of tuberculosis, chest films were made mandatory for all men called in the present mobilization. Standard 14 by 17 inch celluloid films were employed, with the aid of radiologists in hospitals or private offices throughout Canada. The rate of rejection for tuberculosis was reported as 1.06 per cent.

In mobilization in Australia the fluorophotographic method with 35 mm. film has been used extensively.[7] The rate of rejection for tuberculosis was reported as 0.5 per cent. Even with this low rate it is believed a substantial saving is effected.

SELECTIVE SERVICE EXAMINATIONS IN THE UNITED STATES

It was officially recognized by the Surgeon General of the Army in 1940 that roentgen ray examination of all recruits was desirable. In Mobilization Regulations [8] issued Aug. 31, 1940 tuberculosis of the lungs was made a disqualifying defect except for arrested disease of minimal extent, that extent being carefully defined on a roentgenologic basis. In such cases an opinion of the examining physician was required on the possibility of reactivation under conditions of military service. However, the roentgenologic standard could not be applied routinely, since roentgenograms frequently were not made both because of lack of equipment in many of the induction centers and because of other administrative details in the individual corps areas over which the Surgeon General did not have control. Thus tuberculosis of the lungs was declared a disqualifying defect, with the exception noted in the preceding paragraph, but the chest examination in many instances was made by the methods of physical diagnosis only. The regulations read "The chest examinations will include the usual methods of physical diagnosis supplemented, whenever indicated, by radiographic and laboratory studies." There was no lack of appreciation by the Surgeon General's Office and line officers that the phrase "whenever indicated" should be interpreted liberally. An order [9] issued by the Adjutant General on Oct. 25, 1940 directed the commanding generals of all corps areas and departments to make chest roentgen ray examination on every registrant with evidence suggesting pulmonary disease and in addition routinely on all registrants as far as local roentgenologic facilities would permit, through arrangements made with state and civilian roentgenologic laboratories, methods of compensation being carefully outlined.

The surgeons of the first, second and third corps areas took full advantage of the directive order. In these areas almost every prospective recruit reaching the induction center had a chest roentgen ray examination. In the other areas the coverage was much less, varying from about 80 per cent in the seventh corps area to almost complete omission of roentgen ray examination of inductees in other corps areas. Figures given by Col. C. C. Hillman [10] of the Office of the Surgeon General of the Army indicate that approximately 51 per cent of men called to induction centers up to March 1, 1941 received roentgen ray examination.

In April 1941 new roentgen ray equipment was received in approximately half of the induction centers in operation. In the next few months it is apparent that much more equipment will be made available, so that shortly chest roentgen ray examination will be made of all candidates for induction.

However, it is impossible to discount the fact that about half of the men inducted in the first six months of Selective Service did not have chest roentgen ray examinations. Presumably in this group are many men with minimal or even more advanced tuberculosis undetectable or at least undetected by the methods of physical examination used, who will be discovered later to be tuberculous and become the beneficiaries of the federal government for supposedly service connected disease.

ROENTGENOLOGIC METHODS AVAILABLE

A major difficulty will be overcome when roentgen ray equipment is installed in all induction centers. However, the equipment will not be uniform and some variation in results from different stations may be expected on this score. A subcommittee on tuberculosis, one of several committees set up in the Division of Medical Sciences of the National Research Council to advise the medical officers of the military services (see Larkey [11] for list of committees), considered the following acceptable for chest roentgen ray examination for tuberculosis: single standard size (14 by 17 inch) celluloid films, single standard size paper "films," 4 by 5 inch fluorograms and 35 mm. fluorograms.

Much attention has been given by radiologists and tuberculosis specialists to the relative merits of the different types of chest roentgen ray examination, and varying conclusions have been reached, based on speed, cost and reliability. An unprejudiced review of the literature indicates that no other method yet devised results in a product equal in reliability to standard sized celluloid films prepared with proper technic. The latter are definitely superior to 4 by 5 inch fluorograms, and these in turn surpass 35 mm. fluorograms in the detection of small tuberculous lesions, even when the latter have the advantage of stereoscopic examination. Deduction from published reports indicates that paper films and 4 by 5 inch fluorograms are of about equal merit in the detection of minimal tuberculous lesions.

Approximately half of the induction centers at the present time are equipped to make 4 by 5 inch fluorograms. However, in view of the admitted superiority of 14 by 17 inch celluloid chest films taken by standard roentgenography and the probability of frequent referral for standard technic after fluorography or other methods, there is reason to believe that increased reliance will be placed on full sized celluloid films in the future. The opinion has been expressed frequently that the additional cost above that for the rapid methods using small film or paper is small in comparison with the saving effected.

PERSONNEL FOR EXAMINATION

A problem greater than that of equipment is interpretation of the roentgenograms secured. Results now available show a wide variation in the amount of exclusion for tuberculosis at the different induction stations, a variation greatly exceeding that to be expected from differences in known tuberculosis morbidity in different

6. Jones, W. A.: Routine Chest Examination of Recruits, Canad. M. A. J. **43**: 213 (Sept.) 1940.
7. Cooper, E. L.: Pulmonary Tuberculosis in Recruits: Experiences in a Survey by the Microradiographic Method, Brit. M. J. **2**: 245 (Aug. 24) 1940.
8. Standards of Physical Examination During Mobilization, MR 1-9, War Department, Washington, D. C., Aug. 31, 1940.
9. Chest X-Rays on Induction Examination, Adjutant General to Commanding Officers of All Corps Areas and Departments, Oct. 25, 1940.
10. Hillman, C. C.: Personal communication to the author.
11. Larkey, S. V.: The National Research Council and Medical Preparedness, War Medicine **1**: 77 (Jan.) 1940.

geographic regions. The conclusion is inescapable that the interpretation of films and bases for rejection are not the same at different induction centers. The chief reasons for variation seem to be personal differences among radiologists in reading films and variance in interpretation of standards for rejection. Two remedies should be applied. The first of these is selection, for the interpretation of chest roentgenograms, of physicians highly competent in the radiologic diagnosis of tuberculosis. The great cost from undetected tuberculosis makes this requirement necessary. The subcommittee on tuberculosis in the National Research Council, to which reference has been made, has recommended not only that roentgen ray examination be made of all candidates for admission in the army but that each induction board include in its personnel an expert in the diagnosis and care of tuberculosis, and that in the course of the preinduction examinations this physician be required to view all chest roentgenograms taken.

Much progress has been made in cooperative efforts between the American Medical Association, the National Research Council and the Surgeon Generals of the Army and Navy in evaluating the competence of physicians who have designated special interest in some one of the medical specialties, including tuberculosis. (See Leland [12] for a review of actions by the American Medical Association and Larkey [11] for the activities of the Division of Medical Sciences of the National Research Council.) Evaluation lists, permitting the most advantageous selection of personnel, are being made available to the Surgeon Generals of the military services.

STANDARDS FOR REJECTION

The other remedy for the present lack of uniformity in rejection for tuberculosis is improvement in the phrasing of standards for acceptance and rejection. The experience of the first six months of Selective Service showed that the greatest problems in the exclusion of men on the basis of chest roentgen ray examination lie in the determination of the significance and stability of small scars found in the lung fields on roentgenologic examination, and of the calcified masses found in the lung fields and at the lung roots. It appears desirable to define the limits of acceptance closely on an anatomic basis and to make certain that the objective determination of the character and extent of lesions is considered in the light of good clinical judgment. It is believed that small strandlike fibroid lesions should not exclude a prospective recruit from acceptance, provided acceptance is deferred until subsequent examinations show the scar to be perfectly stable. Furthermore, small isolated calcified residues of lesions characteristic of primary infection of the lungs and tracheobronchial nodes should not be cause for rejection provided they appear in the roentgenogram as dense, isolated, sharply circumscribed masses and are not numerous. Long experience has shown that such lesions are reactivated rarely if ever. It is expected that new standards defining the limits objectively will be adopted.

RATE OF REJECTION FOR TUBERCULOSIS

Because of the variability of returns from the different areas and the amount of selection of cases for roentgenography in these areas, a simple summation of returns to date would not give a valid picture of the amount of tuberculosis being discovered. It will be better to refer to figures from areas of complete roentgenologic coverage of men coming up for induction, where the personnel employed is known to be thoroughly competent and where the average tuberculosis rate is approximately that of the United States as a whole. A recent paper by Plunkett [13] on examinations in upstate New York, giving figures for Buffalo, Syracuse and Albany, provides information probably affording an index for determining the amount of tuberculosis to be found in the general course of preinduction examination. In the examinations reported for these cities 0.9 per cent of candidates for induction were rejected for military service because of roentgen ray evidence of tuberculosis. Different methods of roentgen ray examination were used in the induction centers in these three cities, with slightly differing results. The average cost of the roentgen ray examination in the period covered by the report was 54 cents per man. The average per capita cost for cases of tuberculosis discovered was $63.

A slightly higher figure of rejection has held in New York City, where the rate of disqualification for tuberculosis, according to Edwards,[14] has been approximately 1.3 per cent. In the men rejected for significant tuberculosis the disease discovered was minimal in 50 per cent, moderately advanced in 43 per cent and far advanced in 7 per cent.

In Pennsylvania similar figures have been recorded. According to Reynolds [15] about 0.5 per cent of men called were rejected on evidence of tuberculosis by the local draft boards, and 1.46 per cent were rejected at the induction centers. Thus in this state the total rate of rejection for tuberculosis is about 2 per cent.

THE GOAL TO BE ACHIEVED

Experience during and after the World War indicates that preinduction roentgen ray examination is necessary if great costs for the compensation and care of tuberculous veterans are to be avoided, and recent experience in both the Army and the Navy shows that universal preinduction examination is practical and feasible. With the means available it appears easily possible to induct an army without any clinically significant tuberculosis. Roentgenologic examination of enlisted and inducted men who escaped such examination on admission should be made as soon as possible to free the Army from its present unrecognized clinically significant cases and thereby prevent spread from healthy to well persons within the army. Finally, periodic reexamination by roentgenology is essential to discover new cases resulting from outside exposure. Admittedly all of this is costly in money and soldiers' time, but past experience indicates that such expenditures will be justified in the ultimate great saving effected. In addition to the saving effected for public funds in the avoidance of heavy costs due to tuberculosis, a great benefit will ensue for the men concerned and the country in the early detection of many cases that might otherwise progress to an advanced state. Early discovery should insure prompt arrest in the majority of such cases. Thus universal preinduction chest roentgenography in the examinations for Selective Service and voluntary enlistment in the Army and the Navy can be an effective measure in promoting personal and public health in addition to its immediate value for military purposes.

Seventh and Lombard streets.

12. Leland, R. G.: A Census of Physicians for Military Preparedness, War Medicine **1**: 95 (Jan.) 1941.

13. Plunkett, R. E.: Tuberculosis Among Selective Service Men in New York State, War Medicine, to be published.

14. Edwards, H. R.: Personal communication to the author.

15. Reynolds, C. R.: Personal communication to the author.

SYMPOSIUM ON POLIOMYELITIS

The six articles which follow comprise a panel discussion on poliomyelitis which was read at the annual session of the American Medical Association in Cleveland, June 3, 1941. The discussion was sponsored by the National Foundation for Infantile Paralysis and the American Medical Association.

ETIOLOGY OF POLIOMYELITIS

ALBERT B. SABIN, M.D.
CINCINNATI

Poliomyelitis is an acute infectious disease that is caused by a filtrable virus with sufficiently distinct properties to permit its identification with as much certainty as is possible for any of the well known bacteria. A virus can be identified by its size, by its host range (i. e. the species of animals which it can or cannot infect), by its tissue affinities and therefore the type of disease it engenders, by the changes it produces in infected cells and by its immunologic properties. With regard to the etiologic agent of poliomyelitis it is known that it is one of the smallest filtrable viruses, its size having been estimated at approximately ten millionths of a millimeter (10 millimicrons). Thus it can pass through the finest filters and membranes, which retain not only the bacteria but most other viruses as well. It can be sedimented only by prolonged centrifugation on powerful ultracentrifuges, and it is known that the individual virus particle is large enough to accommodate only a few molecules of the size of hemoglobin. The virus has been purified to a considerable degree both by adsorption and elution with alumina gels and by differential ultracentrifugation. The material obtained by both methods of purification contained only 5 to 10 millionths of a milligram of nitrogen per infectious dose of virus. While the virus is resistant to phenol and ether, it is most readily destroyed by oxidizing agents such as hydrogen peroxide and potassium permanganate, by ultraviolet rays and by heating at temperatures of 55 C. or higher for as short a time as five minutes. Recent experiments have brought out the possibility that the amount of chlorination adequate for killing enteric bacteria in water may not suffice to destroy the virus of poliomyelitis.

Of all the viruses known to attack the human nervous system, the virus of poliomyelitis has the most limited host range. The virus, as contained in human tissues or excreta, has thus far been found to be pathogenic only for certain monkeys and chimpanzees but not for mice, guinea pigs or rabbits. Armstrong's recent adaptation of a strain of poliomyelitis virus to cotton rats and mice has not thus far been reproduced with any other of a large number of recently isolated or monkey passaged strains of the virus. Other more recent reports of adaptations to rats, mice and guinea pigs have not yet presented sufficient evidence to permit any definite conclusion. Whether or not Armstrong's cotton rat and mouse adapted virus is actually a human poliomyelitis virus, the fact that it is neutralized by approximately 70 per cent of human serums and certain monkey convalescent serums suggests a close immunologic relationship to most strains of poliomyelitis virus. Since it is now known that mice can spontaneously carry a virus in their intestinal tract which on occasion invades their nervous system to produce a poliomyelitis-like disease, and since this mouse virus has the same size and tissue affinities and is also pathogenic for cotton rats although not for monkeys, the possibility is now being considered that there may perhaps be a whole family of poliomyelitis viruses in nature which vary not only in their natural habitat but also in their experimental host range, and some of them may be immunologically related to a certain degree. The analogy for this concept is found in the herpes simplex, B. virus and pseudorabies family of viruses—all of which are of the same size, have similar tissue affinities, produce similar inclusion bodies, possess a certain immunologic relationship but reside in different hosts (herpes simplex in man, B. virus in monkeys, pseudorabies in pigs and cattle) and vary in their experimental host range.

Poliomyelitis virus possesses highly specialized tissue affinities. Numerous studies on monkeys and human beings have thus far failed to bring forth any evidence to suggest that the poliomyelitis virus can multiply in cells other than the neurons of susceptible hosts. This strict neuronotropism and definite tissue specificity of poliomyelitis virus is reflected not only in its limited adult host range but also in its inability to multiply in the undifferentiated embryonic chick or mouse tissues in which so many other viruses have been cultivated. The only unequivocal, successful multiplication of the virus in vitro has been found by Olitsky and me to take place in the brain and cord of young human embryos, while no growth occurred in cultures containing the lungs, kidneys, liver and spleen of the same embryos. Confirmatory evidence of its growth in cultures containing human embryonic nervous tissue was obtained in Burnet's laboratory in Australia.

Before proceeding to a consideration of the behavior of the virus in monkeys and in human beings it may be worth while to call attention to the fact that many immunologically distinct types have been demonstrated which are so sharply defined that the serum of monkeys convalescent from one type will not protect against another, and also that the convalescent monkeys which are immune to reinoculation with the homologous type can be reinfected with a heterologous type. It is of some interest, therefore, that approximately 70 per cent of human adult serums have been found to neutralize not only standard monkey passage virus but also Armstrong's mouse adapted Lansing strain. However, competent investigators have recently questioned anew the hypothesis that the antipoliomyelitis antibodies in human serums are the result of infection with the virus, and no definite conclusions are possible until further investigations have been carried out. Despite many efforts, it has not been possible to demonstrate specific immunologic reactivity by means of precipitin tests, complement fixation tests or cutaneous tests, and the aid which these tests can render in the specific diagnosis of many other infectious diseases is not available in poliomyelitis.

From the Children's Hospital Research Foundation and the Department of Pediatrics, University of Cincinnati College of Medicine.

The work of the past few years has indicated that the invasiveness and behavior of the poliomyelitis virus may vary in different species of monkeys, as well as in chimpanzees and human beings. The ease with which the experimental disease is produced in rhesus monkeys by direct injection of the virus into the central nervous system, the large nerve trunks or the vitreous of the eye is of little consequence in a consideration of possible natural routes of infection. It is also well established that experimental poliomyelitis can be produced with varying degrees of frequency in rhesus monkeys by injecting the virus into the peritoneal cavity, the tonsillopharyngeal region, intracutaneously, subcutaneously, intravenously or into the intestine. That all these peripheral sites do not offer the virus equally good opportunities for invasion of the nervous system was demonstrated in a study which revealed the special susceptibility of the tonsillopharyngeal region. It was found that amounts of virus which were regularly innocuous when given intracutaneously or subcutaneously produced the disease, which incidentally was predominantly bulbar in type, in 80 per cent of rhesus monkeys when injected into the tonsillopharyngeal region. It was furthermore shown that under those circumstances the virus invaded the central nervous system along the nerves supplying the tonsillopharyngeal region rather than along the olfactory pathway. This greater capacity of virus localized in the tonsillopharyngeal region to invade the nervous system may account for the relatively large number of cases of bulbar poliomyelitis which have been reported in the past ten years as occurring within a short time after tonsillectomies and adenoidectomies performed at a time when poliomyelitis was prevalent in the communities.

Without any trauma, however, and by transitory contact alone, experimental poliomyelitis develops most regularly in rhesus monkeys when the virus is instilled intranasally and the olfactory pathway is available for its progression into the nervous system. On the other hand, it is equally well established that rhesus monkeys can swallow or receive by stomach tube large amounts of virus, which pass through the alimentary tract in active form, without ever contracting poliomyelitis. It is this fact, probably more than any other, that has been responsible for the consideration of the nasal route, and more specifically the olfactory pathway, as the most probable natural portal of entry of the virus in man. A number of events in recent years, however, has led many investigators to question the validity of this concept and to reexamine some of the foundations on which it rested. Among these events was the apparent lack of success in human beings of the chemoprophylactic procedures which so readily protected monkeys against infection by the nasal route and the absence in human olfactory bulbs of the lesions found to be reliable indicators of the olfactory portal of entry in monkeys.

In the years preceding these events there were some scattered reports that in cynomolgus monkeys, as contrasted with the rhesus, it was possible to produce poliomyelitis by feeding the virus. It was never clear in these experiments, however, that infection had not occurred by way of the olfactory pathway as a result of contamination of the nasal mucosa. More recently Burnet, Jackson and Robertson reported the production of poliomyelitis in cynomolgus monkeys by swabbing the virus on the throat or tongue and by feeding under conditions which presumably excluded the olfactory pathway. More striking evidence that infection through the alimentary tract without involving of the olfactory pathway is possible in still another host was supplied in the past year by Howe and Bodian, who showed that chimpanzees whose olfactory tracts had been severed contracted poliomyelitis after being fed virus contained in human stools.

Our knowledge of the behavior of the virus in human beings was so meager, however, that it was not possible to construct any picture of the natural history of the disease. It was known, for example, (1) that in the human disease the virus was demonstrable in the central nervous system, although its distribution therein was unknown; (2) that it had been isolated on a number of occasions from the tonsils, although it was not clear whether the virus was in the tonsils or in the attached pharyngeal tissue; (3) that on one occasion it was presumably isolated from the nasal mucosa, and (4) that on a number of occasions it had been demonstrated in nasopharyngeal washings, although it was never clear whether the virus in such washings originated from the nose or from the pharynx. The fact has finally been firmly established in the past few years that the virus is present in the intestinal contents, although again the source of the virus in those contents was unknown, and the commonest explanation since the first reports of Kling, Petersson and Wernstedt has been that it has its origin in the swallowed secretions of the upper respiratory tract. Some controversy existed about the occasional demonstration of virus in certain lymph nodes, but it has been generally agreed that it is not present in the blood, the spinal fluid or the viscera.

In a study of human poliomyelitis which I carried out in association with Dr. Robert Ward during the past year the distribution of virus throughout the body was mapped. Twenty-two different specimens taken in each case were tested for virus. The tissues tested were selected for their capacity to indicate (*a*) whether or not a certain system was affected, (*b*) what might be the centrifugal or centripetal pathways pursued by the virus outside the central nervous system and (*c*) whether at the time of death the virus is distributed indiscriminately throughout the central nervous system or is present in appreciable amounts in some areas and not in others in accord with a definite pattern. In brief, the results indicated (*a*) that in human beings the virus is distributed predominantly in only two systems—the nervous system and the alimentary tract, (*b*) that it does not spread centrifugally from the central nervous system to affect peripheral tissues containing collections of nerve cells of the sympathetic or parasympathetic systems and (*c*) that even at death the virus is not distributed indiscriminately in the central nervous system but rather that it is confined to certain regions in good agreement not only with the known distribution of neuronal lesions but also with a progression of virus along specific pathways and insulated tracts. Thus in the central nervous system, the olfactory bulbs, the anterior perforated substance with the adjacent corpus striatum and the anterior frontal and occipital portions of the neopallial cortex were consistently negative, while the motor cortex, the diencephalon, the mesencephalon, the medulla and pons and the spinal cord were predominantly positive. In the alimentary tract the virus was found in the pharyngeal tissue, whether or not the tonsils were present, in the washed wall of the ileum as well as in the contents, and only once in the washed wall of the descending colon, while its contents regularly contained the virus. On the other

hand, tests for virus in the nasal mucosa, the salivary glands, the superior cervical sympathetic ganglions, the adrenals and the cervical and mesenteric lymph nodes were consistently negative. In view of this indication that the centrifugal spread of virus, which is so common in rabies, does not occur in human poliomyelitis, it is considered significant as a possible index of one centripetal pathway that the virus was found in at least 1 instance in the abdominal sympathetic (celiac) ganglions. The pattern of virus distribution in human poliomyelitis, as it emerges from this study, points to almost the entire alimentary tract as the primary site of attack by the virus and contains no support for the concepts involving the olfactory pathway, the respiratory tract or the cutaneous route, although it is conceivable that occasional infection by direct contamination of the broken skin may be possible. Because of the total absence of evidence indicative of generalized dissemination or secondary centrifugal spread of the virus, the involvement of the walls of the alimentary tract can, in the light of our present knowledge, be interpreted only that that is where the virus enters the body and multiplies outside the central nervous system. A simultaneous study on the elimination of virus in human poliomyelitis revealed that when comparable methods were used the nasal secretions, oral secretions and urine were not infective, while the stools were positive in about 40 per cent of the paralytic cases. It was observed incidentally that in children under 8 years of age the virus could be demonstrated in 64 per cent of the group, which was four times as frequent as in the older age groups.

Having surveyed all these observations one might inquire as to just how the course of events in human poliomyelitis may be visualized on the basis of present knowledge. It seems to me that one may be permitted to visualize the virus entering the human body by way of the mouth and establishing itself throughout the alimentary tract, where it proceeds to multiply. While further work is necessary to indicate to what extent various levels of the alimentary tract are affected, there is already more than suggestive evidence that the walls of the pharynx and small intestine are among the chief sites of virus multiplication, and the feces the chief means of virus elimination. Whether the virus multiplies in the nerve cells, which are contained in the walls of the alimentary tract, or in the non-nervous tissues remains unknown. However, whatever the type of cells affected in the alimentary tract, the virus may be visualized as beginning its invasion of the central nervous system essentially along two pathways: one leading into the medulla by way of the cranial nerves that supply the upper part of the tract or by way of the parasympathetic system along the vagus from the lower part, and the other leading into the spinal cord either along the visceral afferent fibers through the spinal ganglions or along the visceral efferent fibers from the intestine by way of the abdominal sympathetic ganglions. If the greater attack and spread of the virus is along the first pathway one may expect a syndrome in which bulbar signs are primary, while if the second pathway is more predominantly affected the primary paralysis would be in the extremities. That these pathways may perhaps be used simultaneously, the outcome depending on the route by which the virus arrives in the central nervous system first, is suggested by the fact that in a purely bulbar case the virus has been found in the pharynx, ileum, colon and abdominal sympathetic ganglions.

The inapparent or abortive type of case would be either one in which virus multiplication is limited to the alimentary tract or one in which the virus also invades the central nervous system but fails to destroy a sufficient number of nerve cells to give rise to clinical signs. This view is based in part on the recent finding in monkeys inoculated with human virus that an equilibrium may be reached between the host and the virus before sufficient neurons have been destroyed to interfere with apparently normal function. Similarly, in the nonparalytic type of poliomyelitis the virus may be visualized as multiplying in the alimentary tract and invading the central nervous system, but the activity of the virus within the nervous system is suppressed before a sufficient number of neurons to give rise to paralysis has been destroyed. That the virus may continue to multiply in the alimentary tract long after the disappearance of clinical signs of disease is evident from the fact that in some instances the virus has been found to be excreted in the stools for weeks and months after clinical recovery; one instance is recorded in which a patient with abortive poliomyelitis is still excreting the virus four months after a mild illness of two days' duration.

Finally, I should like to stress that the picture of human poliomyelitis which I have just drawn represents only a working hypothesis suggested by existing data, and it must be realized that as new knowledge is accumulated it will be either modified and extended or completely abandoned.

DIAGNOSIS OF POLIOMYELITIS

JOHN A. TOOMEY, M.D.
CLEVELAND

To diagnose poliomyelitis it is necessary to know the types of poliomyelitis that have been described. These are noted in table 1.

Rarely is the clinical disease solely abortive, peripheral, meningeal, cortical, facial or hemiplegic. Usually the patient has a combination of types with spinal or bulbar involvement. Thus, a patient may have a bulbospinal or spinal condition with one or more of the following: meningeal irritation, some form of peripheral nerve irritation, a facial involvement, hemiplegic involvement and, in rare instances, a cortical reaction. Uncomplicated disease of the spinal cord is not fatal unless there is Landry's type of spread of the disease or the infection spreads to and involves the cervical area. Incidentally, the mortality rate is highest in the group of cases of bulbar and bulbospinal poliomyelitis.

Poliomyelitis is a disease of the lower motor neurons. In the fully developed case, the deep reflexes are decreased or absent; the pathologic reflexes are absent; loss of function, atrophy of muscles and a reaction to degeneration are found.

The normal deep reflex responses are not always absent. If the disease process spreads slowly, they may be overactive at first but tire with repeated stimuli. The physician should not be satisfied merely to demonstrate hyperactivity; he should continue to test the reflex response to determine whether or not hyperactivity persists or whether hypoactivity or loss of response will follow repeated stimulation. The reflexes on one side as compared to those on the other may be

decreased, or they may be absent entirely, as when paralysis is definitely present. If the patient is paralyzed and reflexes still persist, the diagnosis of poliomyelitis should be questioned.

The superficial abdominal reflexes disappear very early in this disease. One should not confuse these with the deep abdominal reflexes. In most cases, the former diminish or disappear in the early stages of the disease, as they do in typhoid, another gastrointestinal disease.

Table 1.—*Types of Poliomyelitis*

	Type	Paralysis	Mortality	Incidence
I	Abortive	Absent	None	Said to be common in epidemics
II	Peripheral neuritis	Absent	None	Rarely seen
III	Meningeal	Absent	None	Rarely present alone
IV	Spinal	Present	About 3%	Most common type (75-90%)
V	Bulbar	Present	High (75-100%)	Next most common type (10-25%)
VI	Facial	Present	Low when sole involvement	Not infrequent
VII	Hemiplegia	Present	Low	Infrequent; rarely seen save during large epidemics
VIII	Cortical	Absent	None	Rarely seen save during large epidemics

In testing for the superficial responses, one should flicker a piece of cotton only lightly over the abdomen. The deep abdominal reflexes are usually present; these can be elicited by pressing the abdomen deeply with an applicator. One can continue pressing and proceed downward over the inside of the thigh and thus obtain the cremasteric reflex. These and the deep reflexes of the abdominal wall are reflexes of a spinal arc type.

It should be remembered that the presence of paresis is just as much evidence of a reacting nervous condition as is the presence of paralysis. In the latter condition, however, the lost function is more obvious. Muscles should be tested against resistance and in their natural arcs, e. g. the foot muscles in walking, standing on the toes, standing on one foot and walking upstairs.

The reflex changes in the order of their frequency occur as follows: loss of superficial abdominal reflexes, diminished or absent deep reflexes, knee, ankle, biceps and triceps reflexes and so on.

A superimposed meningeal reaction may be present as well, with a stiff neck, a positive Kernig sign, a positive Brudzinski sign, pain in the neck, pain along the spine and opisthotonos.

When signs of a lower motor neuron lesion and a meningeal irritation are present, the chances are that the diagnosis is poliomyelitis.

If there is a cortical involvement, and this is rare, all or some of the signs of an upper motor neuron response may be present, such as hyperactive reflexes, spasticity, incoordination, pathologic reflexes (Babinski, Oppenheim and the like) and clonus. Function is not lost and atrophy and reaction to degeneration are absent. These signs may be present after the period of shock is over.

Poliomyelitis is a segmental disease. Legs and arms are late embryologic acquisitions. As they bud out from the embryo they take with them their nerve supply. These nerves do not run like the segmental nerves to the rib muscles; they become bunched, crowded and arranged in a plexus. Thus, fibers from several segments run from the cord to several muscles in the periphery, often in one large nerve. If a segment in the cord is involved, then only the muscles supplied by the nerves from that area will become affected, despite the fact that the nerve to the periphery might carry many other nerve fibers from many other segments (fig. 1).

A long nerve in the arm or leg should be examined. If the leg is involved, the sciatic nerve should be studied. This nerve supplies practically all muscles on the back of the thigh and all those below the knee. If the patient can wiggle the toes but is unable to move the gastrocnemius muscle group, the lesion is probably central in origin and hence segmental in type.

In multiple neuropathy, all the reaches of a nerve are involved irrespective of segmental origin. All branches of the nerve peripheral to the point of irritation will be involved and all signs distal to this will be those of a lower motor neuron lesion. In a patient who has paralysis which has started in the tips of the toes or fingers, a peripheral disease should be suspected.

In poliomyelitis there must be not only a lower motor neuron disease but this disease must be segmental in character.

Clinically, the signs that appear are stiff neck, pain along the spine, head drop, a positive Kernig sign and occasionally a positive Brudzinski sign. The stiffness of the neck, when present, is not similar to that seen in meningitis. It is more voluntary, a mobilization of the neck muscles which can be overcome by a slight, steady resistance, unlike that in true meningitis.

Pain is often described. Such pain is not in the skin, which is never hyperesthetic. The pain is in the muscle. It is present when the muscle is activated and can be elicited by pressure over the muscles and especially at the points at which the tendons insert themselves into the bones. This pain is not commonly present, but when found it may be severe, and the patient will object to being handled and will adopt a froglike position in bed. Usually, these painful muscle groups are the ones that subsequently become paralyzed.

Often, long before the somatic muscles in the arms and legs are involved the urinary bladder and the gastrointestinal tract have become paralyzed. Frequently, this is unnoticed in children because of bed wetting. The bladder should always be carefully examined because quite often these patients have paralysis of the bladder with retention and overflow dribbling.

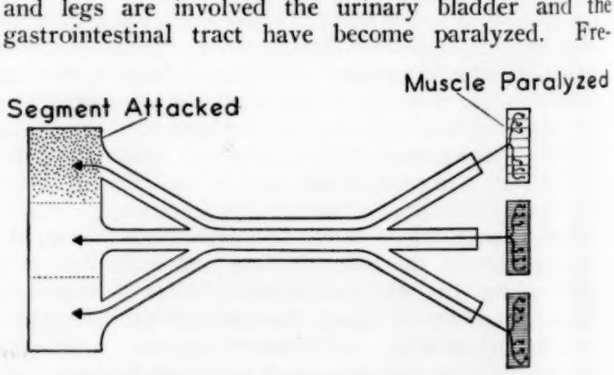

Fig. 1.—Schematic drawing to illustrate segmental paralysis.

The paralysis of the intestine is obvious, even to the parents, who often relate that the patient could not move his bowels for several days prior to the time that he became paralyzed.

There is a preparalytic and a paralytic stage of poliomyelitis. There are no differences in symptoms, however, save that there may be no paralysis for from two to four days after the symptoms and general signs appear; or there may be a quiescent period between the usual original symptoms and signs and the paralytic stage; or, as is often the case, the spread of the disease

TABLE 2.—*Differential Signs and Symptoms*

Type	Signs and Symptoms Plus Positive Spinal Fluid Findings
I Abortive and preparalytic	Any one or more of the following: headache, fever 2-5 days lasting 4 days or more, stiff neck, pain along the spine, nausea, vomiting, gastrointestinal signs, diarrhea, constipation, pain and cramps, restlessness, sore throat (not common)
II Peripheral neuritis	Typical symptoms of peripheral neuritis over the skin, chiefly paresthesias (not to be confused with segmental pain of central origin occurring in muscles)
III Meningeal	All symptoms of type I, abortive and preparalytic, plus meningeal signs (mentioned in text), positive Kernig, etc.
IV Spinal	All signs of type I, abortive and preparalytic, and perhaps type III, meningeal; occasional convulsion, delirium, plus segmental pain in the muscles and tendons (not skin hyperesthesia), sweating, irritability, signs of a lower motor neuron lesion, athetoid movements, froglike position in bed; if areas from the second, third and fourth cervical segments are involved, there will be signs of difficult breathing, and suffocation may follow; there may be difficulty in urination and in defecation
V Bulbar	All signs of type I, abortive and preparalytic, perhaps type III, meningeal, and usually type IV, spinal, plus dysarthria, dysphagia, loss of the gag reflex, fast pulse (late), inability to expectorate mucus, somnolence (late), occasional coma; perhaps paralysis of muscles supplied by the ninth, tenth, eleventh and twelfth nerves, less often the seventh and infrequently the third and sixth nerves—the latter usually in the matter of accommodation; individual cranial nerve palsies may occur
VI Facial	All signs of type I, abortive and preparalytic, and occasionally type III, meningeal (typical Bell's palsy findings)
VII Hemiplegic	All signs of type I, abortive and preparalytic, and possibly type III, meningeal, and signs of an upper motor neuron on one side (see text)
VIII Cortical	All signs of type I, abortive and preparalytic, possibly type III, meningeal, plus signs of general encephalitis, i. e., an upper motor neuron lesion

may be so rapid that signs, symptoms and paralysis are synchronous.

The disease cannot be definitely diagnosed unless the spinal fluid presents typical abnormalities. There may be a slight increase in pressure. The color is clear, although occasionally it has a faintly ground-glass appearance. There is an increase in the number of cells, from 25 to 1,000, the average being 100. Most cases are not diagnosed until paralysis appears, at which time the cells found are lymphocytes. In epidemics in which cases may be diagnosed early, even before the paralysis appears, the cells may be predominantly of the polymorphonuclear type, but the leukocytes are usually replaced by lymphocytes within twenty-four to forty-eight hours. The Pandy test is usually positive, from 1 to 4 plus. The sugar and chloride contents are ordinarily normal. Occasionally, the spinal fluid will show a spurious positive Wassermann reaction.

There is no distinctive laboratory test. The spinal fluid itself has rarely been proved to be infectious. If the patient dies, the virus may be isolated from the spinal cord. Even this procedure is difficult and frequently unsuccessful. If the patient recovers, there is no way whereby the diagnosis may be established scientifically, unless neutralizing antibodies can be demonstrated and unless the virus can be found in the nasal washings or gastrointestinal contents. This is not practical for the practitioner.

The symptoms that may occur with the various types of the disease are listed in table 2.

Though I have given the various signs and symptoms, one has to tax one's memory to remember the many uncorrelated details. It is better to consider these from a knowledge of the portal of entry and pathogenesis of the disease. They then become more obvious and clear-cut. For twenty years I have taught that the gastrointestinal tract is the portal of entry in this disease and have pointed out that the spread of the virus would have to be over the sympathetic and parasympathetic nervous systems to the lumbar, cervical and medullary areas in the cord and medulla, with isolated spreads occasionally occurring along cranial nerves (fig. 2). With this in mind, table 3 has been prepared.

The most important evidence in differential diagnosis is obtained from an examination of the spinal fluid. If this is purulent and yellowish, the diagnosis is not poliomyelitis. If there are a great number of leukocytes present and the patient is paralyzed, the diagnosis is usually not poliomyelitis. It might be equine encephalomyelitis. The only time that there is an increased polymorphonuclear leukocyte count in poliomyelitis is during the early stages of the disease, prior to the time when paralysis is present. The practitioner usually does not see cases at this stage. If the cells are predominantly leukocytes, the probabilities are that bacteria cause the condition, and they can be identified on a

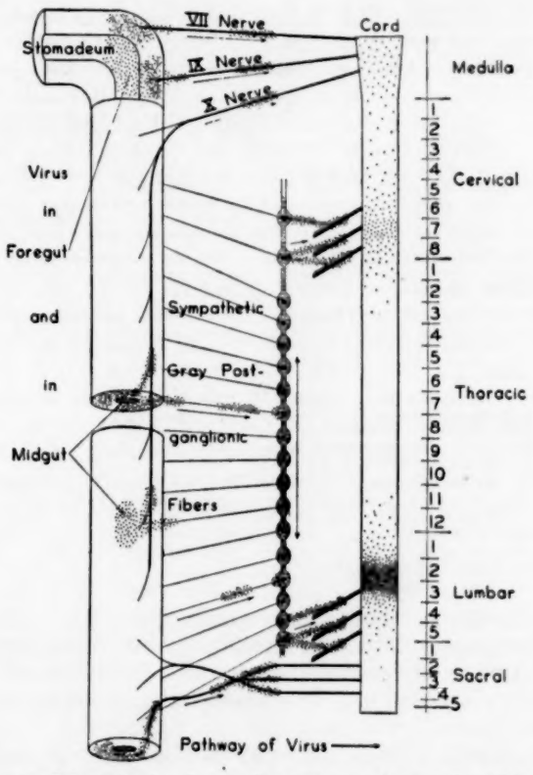

Fig. 2.—Schematic drawing to illustrate spread of poliomyelitis from the gastrointestinal tract. Dots represent the possible position of the virus. Absorption would be along the sympathetic and parasympathetic nervous systems to the lumbar, cervical and medullary areas. Isolated spreads could be along some cranial nerves as indicated. The arrows indicate the possible path of spread.

stained smear. There are two exceptions to this dictum—i. e., when a sterile abscess is approaching the surface, and in cases of early epidemic meningitis, when leukocytes but no organism may be found.

If the type of cell present is mixed and the proportion of lymphocytes is greater than that of leukocytes, the patient is either recovering from an acute infection which might have been pyogenic in origin, commonly an irritation of the meninges, or some disease is developing which ordinarily causes a lymphocytic reaction. A second puncture to determine the further progress of the disease is indicated. If the ratio becomes more lymphocytic, one knows that one is probably dealing with a disease causing a lymphocytic reaction. If the cells are predominantly lymphocytes, it is known that the disease is an encephalitis of some character—it may

TABLE 3.—*Possible Method of Spread of Virus in Infantile Paralysis*

Phase	Position of Virus	Symptoms
I	At first the virus is free in the gastrointestinal tract	There are none; or possibly some with diarrhea and pain
II	The virus becomes fixed in the unmedullated postganglionic fibers of the thoracolumbar outflow and parasympathetic nervous system and spreads along the sympathetic nerve fibers to the ganglions	The abdominal reflexes are absent or modified; there may be constipation, indefinite pain in the belly and pain over the back
III	The virus spreads from the sympathetic nervous system and reaches the somatic segmental nerve	In addition to the symptoms described in phase II, there is hyperactivity of the reflexes with tiring on repeated stimulation
IV	The virus, spreading backward over the somatic segmental nerve, reaches the spinal ganglions	In addition to the symptoms described in phases II and III, there is segmental pain in the muscles and tendons supplied by nerves of the segments involved
V	Simultaneously, the virus is absorbed and excreted; enough may accumulate at one time in the urinary bladder to involve the detrusor and sphincter muscles	A peripheral type of urinary bladder paralysis with overflow dribbling may now appear when the virus factors present are possibly absorbed by the terminal gray nerve fibers of the bladder and its neck, whether of the sympathetic or of the parasympathetic nervous system
VI	The virus reaches the cord and involves the anterior horn cell	In addition to the symptoms described previously, the reflex reactions now become diminished or lost; muscle paresis or paralysis appears
VII	The virus travels up the sympathetic nerve chain to involve the cervical area	Here the train of events is the same as outlined in phases III and VI
VIII	The virus may be virulent enough to be absorbed directly by the vagus nerve (i. e., the connector fibers in the gastrointestinal tract)	A condition simulating bulbar palsy appears; there is dysphagia, dysarthria, etc.
IX	The virus may be absorbed directly over the chorda tympani, from the pharynx, etc., directly to the nucleus of origin of the cranial nerve in the bulb	The results are the same as in phase VIII
X	In the rare instance, the virus may travel along the gray nerve fibers of the autonomic nervous system to the bulb, the internal capsular and the cortical areas	The symptoms here would depend on the localization of the virus, with bulbar palsy, and hemiplegic and encephalitic reactions

be tuberculous, idiopathic, Japanese, syphilitic or the like—or poliomyelitis. In brief, the presence of lymphocytes places the disease among the chronic types of meningeal irritations or among the encephalitides (table 4).

Organisms may be demonstrated in cases of tuberculous encephalitis and virus in those of the St. Louis, Japanese, equine encephalomyelitis and lymphocytic choriomeningitis types.

The amount of protein is of interest. It gives a clue as to the severity of the involvement. In lymphocytic choriomeningitis there is frequently a lack of or a small amount of protein, although a great number of cells may be present. On the other hand, when few or no cells are present and there is a definite protein increase, one should suspect multiple neuropathy.

The sugar in the spinal fluid is definitely decreased in tuberculosis. The serologic reaction is positive in syphilis.

In the differential diagnosis it is important to know the type of neuron lesion, whether lower or upper. The presence of an upper motor neuron lesion practically always rules out poliomyelitis (save in cortical types). The presence of a bizarre type of neurologic response with a combination of lower and upper motor neuron signs practically always identifies tuberculous meningitis. Bizarre neurologic signs are not found in infantile paralysis. A patient with fleeting signs—present one day, absent the next and present the day following—does not have poliomyelitis.

In differential diagnosis, threfore, one must exclude various encephalitides, meningitides, multiple neuropathies, the pseudoparalysis of scurvy and rickets, rheumatic fever and accidents (broken bones).

Equine encephalomyelitis usually attacks children of either sex, has an acute onset, a rapid progression, a mortality of 70 plus per cent and is found where epizootic diseases occur in animals. The spinal fluid is clear to ground-glass in appearance and contains from 200 to 2,000 cells, mostly polymorphonuclear leukocytes; the globulin is 4 plus.

Epidemic encephalitis strikes at patients in the third or fourth decade; it occurs any time with signs and symptoms of an upper motor neuron lesion. This, together with a history of diplopia and a tic, makes a presumptive diagnosis.

St. Louis encephalitis attacks at any age during the summer in the vicinity of St. Louis. The signs are those of an upper motor neuron disease. There are none of a lower motor neuron lesion. There is no involvement of the eye muscles. The disease is transmissible to animals.

In postvaccinal encephalitis, there is encephalitic irritability followed by stupor, a history of vaccination, a relatively low lymphocyte count with an extremely high protein content in the spinal fluid. If the patient is seen at the onset, there are signs of an upper, but not of a lower, motor neuron lesion. Later, during coma, neurologic reactions may be absent.

In lymphocytic choriomeningitis (acute benign idiopathic meningitis, acute aseptic meningitis, benign aseptic choriomeningitis, epidemic meningitis serosa, serous meningitis), the onset is acute and the progress rapid, and it occurs in any age group at any time and in any locality. It is accompanied by headache, muscular pains and sometimes constipation. Neither muscle weaknesses nor neurologic signs are present, except perhaps a positive Kernig sign and a stiff neck. The spinal fluid shows the following: normal sugar and chloride, negative reactions to all tests, a meningitic gold curve, a cell count ranging in number from 20 to over 1,000 cells, 90 per cent of which are lymphocytes, with little or no protein. Clinically, it is impossible at times to separate this entity from the abortive type of poliomyelitis, especially when it occurs during an epidemic of poliomyelitis. However, the virus is easily adapted to rats or mice, and neutralizing antibodies are readily found in the blood serums of patients convalescing from the disease.

Syphilitic meningitis, usually seen in adults, is ruled out by history, positive blood serologic reaction of the spinal fliud, i. e. positive Kline and Wassermann reactions, a paretic curve and the like.

Tuberculous meningitis, found usually in the young of either sex and during any season of the year, is

difficult to exclude, especially if the patient is seen early. There is a history of exposure. The patient with this disease is ill for days with but few symptoms and little or no fever. He progresses to the final stage of somnolence in which there is a rapid progression of the signs and symptoms with bizarre neurologic reactions and involvements of the eye muscles (the chameleon-like eye) and finally death. There is a drop in the sugar content of the spinal fluid.

In cases of influenza there may be a stiff neck, and the gastrointestinal symptoms may be the same as those seen in cases of early poliomyelitis. However, the neurologic and spinal fluid findings are negative.

Multiple neuropathy can be diagnosed by the history and by the presence of combined sensory and motor paralyses; sometimes there is a dissociation of the pain and temperature sense and other signs of a peripheral neuritis. The spinal fluid contains protein. In about 50 per cent of the cases the spinal fluid contains up to 50 cells, all lymphocytes. Poliomyelitis patients may have some edema of the cord, which in itself may cause paralytic symptoms. Edema disappears within two weeks after the onset. If the patient still has massive paralysis after a month has elapsed it is evident that there has been a massive destruction of anterior horn cells. Anterior horn cells do not regenerate; therefore, I may offer as a dictum that "any one who has had massive paralysis for a few weeks and who then completely recovers did not have poliomyelitis." He probably had multiple neuropathy. Most of the so-called cases of winter poliomyelitis that have appeared in our locality have been such.

TABLE 4.—*Type of Cell in Spinal Fluid and Disease Condition*

Leukocytes	Lymphocytes
Pyogenic infections	Encephalitides—Japanese, St. Louis, idiopathic and so on
Equine encephalomyelitis	
Serum disease and so on	Recovered serum disease
Very early poliomyelitis *	Meningitis—tuberculous, syphilitic
Very early tuberculous meningitis	Recovered cases of pyogenic meningitis, poliomyelitis, lymphocytic choriomeningitis

* Rarely seen in practice.

Occasionally, patients are seen in the hospital with herpes zoster, a tumor, acute multiple sclerosis and uremia who may have as many as 50 cells, all lymphocytes, in the spinal fluid; but the physical examination and history will rule out poliomyelitis.

The diagnosis of rickets is usually obvious. There are craniotabes, pot belly, delayed dentition, enlarged wrists and ankles, beaded ribs and the like.

The patient with rheumatic fever may not be able to move his legs because of pain; the immobilization, however, is voluntary. There is an increased sedimentation rate, pain at the insertion of the tendons or in the joints, multiple joint involvement, perhaps a cardiac murmur and a good therapeutic response to salicylic acid.

In children a broken leg or arm must be considered. It is a common thing to have children with fractures diagnosed as having poliomyelitis, and vice versa. Here again movement is painful and hence there is immobilization of the legs. Careful examination shows that all muscles are used, although they are tender. The spinal fluid is normal. Roentgenograms confirm the diagnosis.

When scurvy occurs, there is pain usually along the shafts of the bones, bleeding from the gums, a history of not eating fruits and vegetables containing the anti-scorbutic factor, a positive roentgen examination and a normal spinal fluid.

During the summer, the physician should be on guard for patients who start to have difficulty in speaking, difficulty in clearly enunciating syllables, sounds, words and especially consonants or who have any difficulty in swallowing solid foods or liquids. Such persons should be considered as having poliomyelitis until proved otherwise.

3395 Scranton Road.

THE PATHOLOGY OF POLIOMYELITIS

ERNEST W. GOODPASTURE, M.D.
NASHVILLE, TENN.

Because of the nature of the disease, the early lesions of acute poliomyelitis or infantile paralysis in man are accessible for study only at necropsy, and it is from such material that the cytopathologic picture has been built. Although the chordal and bulbar lesions afford the chief sources for clinical expressions of the disease in the form of palsies, the damaging effects of the infection in the central nervous system are more widespread. Focal areas of injury are present in most if not all cases in the pons, brain stem, motor cortex and meninges, so that a more descriptive terminology would appropriately designate the pathologic-anatomic aspects of the nervous involvement as meningoencephalomyelitis. Evidences of injury have been found likewise in the dorsal root ganglion, and a more complete search would probably disclose lesions rather constantly in these structures and perhaps likewise in peripheral ganglions. Some investigators have attached perhaps too great a significance, at least from the standpoint of pathogenesis, to the extraneural manifestations of irritation and hyperplasia in mesenteric and enteric lymphatic tissue which are especially conspicuous in children.

In the spinal cord the lesions are most prominent and extensive in the cervical and lumbar enlargements, especially in gray matter of the anterior horns.

It is the destruction of ganglion cells in these areas that has dominated the dramatic clinical expression of the disease, notably flaccid paralysis of the extremities, although epidemiologists now believe that nonparalytic infections with the poliomyelitic virus can be recognized during outbreaks in families and in communities.

Pathologically the disease is associated with destructive lesions in the gray matter of the spinal cord and brain, the white tracts being largely spared. More intimately, much discussion and investigation have centered about the problem of the initial site of injury—that is, whether the lesion is essentially an interstitial or a parenchymal myelitis.

The foundation for this controversy was laid by Charcot, who maintained that the original injury involved first the motor ganglion cells in the anterior horns of the spinal cord. The opposing point of view interpreted the degeneration and necrosis of the ganglion cells to be secondary and dependent on injury and inflammatory reaction of the vascular stroma.

It was evident that fundamental problems hinged on the solution of this question and detailed studies of the human and experimental disease have focused on it and

From the Department of Pathology, Vanderbilt University School of Medicine.

have added from time to time increments of knowledge that have led to present day concepts and conjectures of pathogenesis.

Rissler gave the first detailed study of the acute stages of the human lesions in 1888, and subsequent observers have not added much to his general picture of chromatolysis, lysis, coagulative necrosis, inflammation and neuronophagia particularly of the anterior horn ganglion cells, although interpretations have varied and some specific details have been supplied. Wickman, for example, maintained the opinion, as did many of the earlier pathologists, that degeneration of the ganglion cells resulted from primary interstitial reaction even though it was only edema. Forssner and Sjövall attributed to the neuronophages considerable importance in the degeneration of nerve cells, in which process the polymorphonuclear leukocytes and polyblasts seemed to manifest the chief if not the sole activity, while Wickman considered the latter to be the only active agents, because the leukocytes died rapidly. Wickman recognized, nevertheless, as did Strauss, a type of degeneration which seemed to be an autolysis with absorption without phagocytosis, just as Rissler had depicted it sometime before.

Investigation of later years has placed again in the foreground the nerve cell changes, and, as the observation of Forssner and Sjövall has indicated, the view has become prevalent that the majority of ganglion cells are disposed of by means of phagocytosis only as a consequence of their primary and essential injury, which constitutes a sine qua non for neuronophagia.

The point of view of primary injury to the nerve cells is not inconsistent with the clinical manifestations of poliomyelitis, although it does not exclude participation of inflammation as an accessory factor, because it does not explain as well, perhaps, the improvement in the extent of paralysis which follows subsidence of the acute stage of the disease as would a possible removal of mechanical forces or chemical agents supplied by the inflammatory state.

It is not surprising that the inflammatory phenomena in the lesions of poliomyelitis in contrast to neuronal damage attracted so much attention for a while and acquired so great a significance in early studies of the disease, because they usually dominate the microscopic scene. Confined almost exclusively to the gray matter of the cord, but appearing likewise about blood vessels and in the meninges, the inflammation manifests itself even grossly by the protruding, swollen appearance of the anterior horns in transverse sections of the cord proclaiming the edema, while the pink color and the red flecks indicate the congestion of blood vessels, and even rarely petechial foci. Under the microscope congestion is evident, and the infiltration, especially of the anterior horns, of innumerable cells foreign to this tissue demands attention primarily to the extent that an appreciation of the loss of many ganglion cells and the degeneration of others as already described necessitates closer scrutiny. As a rule, extravasation of blood is absent or not a conspicuous feature. Thus the early surmise that the sudden stroke of paralysis might be explained by vascular rupture has not been sustained, nor do emboli or thrombi occur to substantiate the assumption of a vascular basis for pathogenesis. Edema, congestion and the outpouring or multiplication of infiltrating cells might still be accessory mechanical factors contributing to dysfunction of the nerve cells or, through the formation of chemical substances, be responsible to some extent for injury to the nerve cells.

In early interpretations of the lesions those who held the hypothesis of primary damage to nerve cells thought that the infectious agent or its toxin acted directly on these structures and that, many of them having been destroyed, the resulting products induced inflammation. Others maintained that the infectious agent acted primarily on the interstitial tissues causing congestion, hemorrhage and exudation. As a result of the vascular disturbances and the inflammatory reaction nerve cells were damaged or destroyed secondarily.

The investigations of the experimental disease in monkeys published in 1929 by Fairbrother and Hurst threw a new light on the whole subject of the pathology and pathogenesis by their presentation of evidence that the virus of poliomyelitis infects neurons and spreads along axis cylinders from one focus to another. These observations have been confirmed most recently and most conclusively by the work of Bodian and Howe; there is accumulating considerable evidence that the nervous lesions of the human disease can best be explained on the assumption that the virus is neurocytotropic.

Bodian and Howe have postulated two primary pathways for the spread of the infection through the central nervous system, each determined by axonal fibers and groups of nerve cells. They based their view on experiments on monkeys, but preliminary study of human lesions seem to confirm it.

The idea that poliomyelitis is essentially an infection of the central nervous system has not been acceptable to all students of the disease. Some have held with Draper, Peabody and Dochez that there is a general (that is, extraneural) infection involving particularly the lymphatic tissues, and Burrows frankly championed the view that the disease is primarily one of the lymphatic system and that the central nervous system is only rarely and accidentally involved. This view, however, has little support from experimental or human material with respect either to the character and distribution of lesions or to the demonstrable location of virus.

The presence of meningitis in association with poliomyelitis has exerted an important influence on concepts of pathogenesis. Thus Flexner and his associates, basing their conclusions on infected monkeys, maintained that the virus reaches the central nervous system in the human infection by way of perineural lymphatics of the nasal mucosa penetrating the cribriform plate to reach and to infect the leptomeninx. Proliferation of virus in this membrane resulted, they thought, in spread of the infection along perivascular channels into the parenchyma of the central nervous system.

There is no doubt that in the monkey virus can enter the central nervous system through the olfactory mucosa, but there is much sound evidence that it penetrates the olfactory bulbs and spreads through the nervous substance directly by way of axis-cylinders and other nerve cell processes. There is no acceptable evidence that the virus can enter the central nervous system except through neural channels. However, the exact site or sites of entrance in the human disease is not yet known.

One theory is that, as appears to be the case in suitable experiments on monkeys, the virus infects through the nerve fibers of the nasal mucosa and is excreted through the nose along similar channels. The absence of significant lesions in the olfactory bulbs and lobes in the human disease and failure to demonstrate virus in these structures has cast considerable doubt on the nasal route of infection.

In the last few years there has been a renewal of interest in the possibility of infection by way of the gastrointestinal tract. This has been due to the repeated demonstration of poliomyelitic virus in feces and in sewage from infected foci, often in extremely high concentration. There is no doubt now that large quantities of the virus can be eliminated in this way. Convincing evidence that the portal of entry is through the gastrointestinal tract is, however, yet lacking. Some recent experiments indicate that infection can take place more readily through the oral and pharyngeal surfaces than through the intestine (for example, experiments of Howe and Bodian with the chimpanzee). Sabin and Ward found no evidence that the lymphatic tissues of the mesentery harbored the virus in the patients examined by them, but they found it present significantly in the wall of the small intestine.

There is no evidence at hand that the virus of poliomyelitis can infect extraneural tissues, and for the present at least it would seem wise not to neglect the possibility of a neural portal while all other possibilities are being explored. Lesions have been found in posterior root ganglions, and a thorough canvas of the sympathetic and autonomic system both for lesion and for the presence of virus should be made in the quest for the portal of entry and the mechanism of infection of the central nervous system.

SERUM THERAPY AND VACCINATION

HAROLD K. FABER, M.D.
SAN FRANCISCO

SERUM THERAPY

Although the adverse results of experimental and clinical study have caused the abandonment of convalescent serum therapy in poliomyelitis in many places, it is still customary to use it in many others, partly because belief in its efficacy persists and partly because no other treatment with any resemblance to specificity is available. In communities in which its use is customary, it is hard for the physician skeptical of its value to withhold it; if he should do so and the end result is paralysis or death, he may be blamed for the outcome. Since the treatment is ordinarily harmless, he is therefore apt to give it anyway. The situation is unfortunate. It is not the medical ideal to use treatment which is useless. One should weigh carefully the available evidence, both experimental and clinical, to find whether serum actually does benefit the patient and, if so, one should use it. If it does not it should be withheld and the patient or his family spared from false hopes, disappointment and heavy expense.

So far as it is not entirely empirical, serum therapy is based on the specific neutralizing antibody which is found in the serum of many persons who have recovered from poliomyelitis, as well as of the majority of adults without any history of the disease,[1] and which can be artificially induced in animals and in human beings who have received injections of virus. A mixture of such serums with active virus in proper proportions and under suitable conditions will not infect animals. Virus is not, however, destroyed in the process. The action of the neutralizing substance has been shown by Sabin[2] to be not on the virus but on the body cells, which may be protected if the serum reaches them first but not if virus reaches them first. This implies that serum may have a protective effect but not a curative one. The protective effect might conceivably occur even after infection is already present in the body by limiting its extension to areas not yet infected. Broadly speaking, this would appear to be most effective in virus diseases in which, as in measles, after a period of local infection the virus invades the blood stream and becomes generalized; under these circumstances serum given before invasion of the blood stream could protect to some extent.[3] More and more evidence has accumulated, however, that poliomyelitis is not a blood-borne infection and that, as the experiments of Bodian and Howe[4] show, it is not merely neurotropic in the usual sense of the word—that is, specific for the tissues of the central nervous system in general— but is actually neuronotropic—that is, limited in its capacity to multiply to the neurons themselves. It can no longer be maintained that the infection in its so-called preparalytic stage is invading the meninges from without; it is already implanted in the neurons of the central nervous system when the first symptoms show themselves. Microscopic examination shows this clearly, and the fact that changes in the spinal fluid are so often present at the onset is clinical proof. In theory, a possibility of blocking the passage of virus from one neuron to the next by the early use of serum has been suggested[5] but is not supported by the experiments of Schultz and Gebhardt. In two very thorough studies they[6] have shown that an extremely potent serum (in the sense of a high virucidal content) given daily in large amounts beginning twenty-four hours after intranasal inoculation was completely incapable of preventing the development or of modifying the course of the experimental disease. These experiments have been criticized as not applicable to human poliomyelitis because of the greater severity of the disease in the rhesus monkey, but certainly the objection is more than offset by the fact that the monkeys received a much more potent serum, given in large amounts more often and much earlier than is ever done in the case of human beings. It is also known that the presence of neutralizing antibodies in human beings does not prevent the occurrence of the disease, including paralysis, for there are at least 3 instances in which they have been detected in the blood of patients during the preparalytic period.[7] Several workers[8] have come to

From the Department of Pediatrics, Stanford University School of Medicine.

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the conclusion that there is no discoverable relationship in poliomyelitis between actual resistance to infection and the neutralizing antibody, which Schultz [9] regards as "merely an adventitious by-product of infection."

Analysis of the clinical data on serum therapy is complex, difficult and easily misleading, especially so in reports in which there are no untreated controls. A few conspicuous examples of the latter, selected for their high percentages of recovery, are shown in table 1, all patients treated during the preparalytic stage.

At first glance these results, particularly those of Jensen,[10] are very impressive, but serious objection must be raised to accepting them at face value. First of all, the exclusion of patients already paralyzed greatly raised the expectancy of recovery in the remainder over the general rate, regardless of treatment. In at least one study in which serum treatment was not given,[11] the general rate of recovery with no residual paralysis was 86 per cent, and that in 1917 when mild, nonparalytic attacks were somewhat more likely to be missed than later on. The recovery rate for a group in the preparalytic stage (that is, patients in whom paralysis does not develop very early or before the diagnosis is made) is about three times as great as that for patients with initial paralysis and appears to average about 80 per cent.

Second, the day of hospitalization after the onset seems to have a decisive effect on the outcome, since it is to be taken as the time after the onset when the patient is put to bed and to rest. Jensen's data read in this light illustrate the point; here the percentages of recovery were good only for the first two days but after that were actually worse, despite serum treatment, than for the epidemic as a whole.

Third, mistaken diagnosis has at times to be considered. There is no absolute criterion for the diagnosis of poliomyelitis other than recovery of the virus itself; nonparalytic poliomyelitis is always a presumptive

TABLE 1.—*Convalescent Serum Treatment in Preparalytic Stage: Selected Series, No Controls*

Authors	Number of Cases	No Residual Paralysis	
		Number	Per Cent
Macnamara, J., and Morgan, F. G.: Lancet **1**: 527, 1932	76	72	95
Shaw, E. B., and Thelander, H. E.: Calif. & West. Med. **33**: 754, 1930	23	23	100
McEachern, J. M.; Chown, B.; Bell, L. G., and McKenzie, M.: Canad. Pub. Health J. **20**: 235, 1929	74	70	96
Levison, S. O.: Illinois M. J. **70**: 296, 1936	149	135	91
Cowie, D. M.; Parson, T. P., and Lowenberg, K.: Ann. Int. Med. **8**: 521, 1934	80	76	96
Jensen [10]	2,992	2,775	92
Jackson [14]	395	340	86

rather than a certain diagnosis, even during an epidemic. In the large epidemic of 1934 in Los Angeles the question was raised by the U. S. Public Health Service and the California State Department of Public Health [12] on the basis of the mildness of the attacks, the low death rate and the occurrence of many atypical cases whether a concurrent epidemic of another disease might have been present.

Fourth, the proportion of nonparalytic attacks sometimes increases sharply in the later stages of an epidemic, as in that reported by Riggin [13] (in which serum was very little used), thus raising the natural chances of recovery at a time when serum, if employed, would be more generally available and so be given credit for the lowered paralysis rate.

TABLE 2.—*Preparalytic Cases: Outcome in Relation to Treatment*

Treatment	Number of Cases	No Residual Paralysis		Deaths	
		Number	Per Cent	Number	Per Cent
Convalescent serum	2,373	1,716	72.3	83	3.50
Other serums	451	354	78.5	13	1.61
No serum	885	708	80.0	8	0.90
All treatments	3,709	2,778	74.9	104	2.80

From Wesselhoeft's compilation (The Present Status of Serum Treatment in Acute Poliomyelitis, J. Pediat. **3**: 330 [Aug.] 1933).

Fifth, contrary to common opinion, the dose of serum has no apparent relation to the outcome. In Jensen's series the "minimum therapeutic dose" for children was 30 cc., but even this could not always be given early in the epidemic. In Jackson's [14] series the dose was only 20 cc., and in Laidlaw's [15] report the dose was actually inversely proportional to the percentage of recoveries.

Sixth, different epidemics vary considerably in mildness and severity. Without controls, the outcome of the cases under treatment in reference to the quality of the epidemic as a whole cannot be correctly evaluated. Jensen's comment on his own cases would fairly apply to all uncontrolled series; he frankly said "It is quite impossible to state whether the serum-treated cases progressed more favorably than they would have done without serum."

In the series in which there are controls most of the objections cited are at least minimized. These studies have been criticized for failure to alternate treated and untreated patients and because the tendency not to withhold serum from some severely ill patients might have unfairly lowered the average recovery rates for the treated. Sampling errors can be weighed by comparing the results in the treated not only with the untreated but also with the two groups combined. At least one possible sampling error, owing to varying proportions of treated and untreated at different stages of an epidemic, may, as has already been shown, unduly favor the treated.

There are only a few controlled studies of considerable size based on preparalytic cases. That of Kramer and Aycock,[16] with 80 cases, showed no

9. Schultz, E. W.: Immunity and Prophylaxis in Poliomyelitis, J. A. M. A. **107**: 2102 (Dec. 26) 1936.

10. Jensen, C.: The 1934 Epidemic of Poliomyelitis in Denmark, Proc. Roy. Soc. Med. **28**: 1007 (June) 1935.

11. Neal, J. B.; Du Bois, P. L.; Abramson, H. L., and associates: Report of the 1916 Epidemic of Poliomyelitis; from a Clinical and Laboratory Standpoint, Collected Studies of the Bureau of Labor, Dept. Health, New York City **9**: 77, 1916-1919.

12. Leake, J. P.; Cedar, E. T.; Dearing, W. P.; Gilliam, A. G., and Chope, H. D.: Epidemiology of Poliomyelitis in California, 1934, Am. J. Pub. Health **24**: 1204 (Dec.) 1934.

13. Riggin, I. C.: Poliomyelitis in Virginia During 1935, Am. J. Pub. Health **26**: 98 (Feb.) 1936.

14. Jackson, F. W.: The 1936 Epidemic of Poliomyelitis in Manitoba, Canad. Pub. Health J. **28**: 363 (Aug.) 1937.

15. Laidlaw, F. W.: Poliomyelitis in the State of New York in 1931: A Preliminary Study of 1,559 Cases, J. A. M. A. **99**: 1053 (Sept. 24) 1932.

16. Kramer, S. D.; Aycock, W. L.; Solomon, C. I., and Thenebe, C. L.: Convalescent Serum Therapy in Preparalytic Poliomyelitis, New England J. Med. **206**: 432 (March 3) 1932.

advantage for treatment, but the data are not given in detail and are not included in the table. Laidlaw's report is not included because of the relatively small number in the untreated group; this showed 71 per cent recovery as compared with 77 per cent in the treated group. The report of Harmon, Krigsten and Harkins [17] is given in the table although the 29 per cent recovery in the untreated group is so far below the 71 per cent average of all other reports on untreated preparalytic cases as compiled two years before by Harmon in another paper [18] as to raise a serious doubt of the method of selection of cases. This is the only series in which a significant difference (by the chi square method) is found between the treated and the untreated and it accounts for the slightly higher percentage of recovery for the treated group in the totals.

There is now a considerable body of evidence on the possibilities and actual effects of serum treatment; a fair appraisal of it shows little to support the belief that it can be or is actually curative and a good deal to deny that belief. This could hardly occur even if a slight beneficial action existed such as might perhaps be enhanced by improved selection of serum or by its use in larger amounts.

While serum will probably be continued to be used on the basis that it is harmless, because there is no satisfactory substitute and in the belief that it may possibly do the individual patient some good, certain suggestions are in order. First, I believe that there should be no obligation, moral or legal, on the physician to give it; nor should he be held responsible for having withheld it if the outcome of the case is unfavorable. Second, there is no sound basis for the use of convalescent serum instead of the serum or whole blood of normal adults. The former is difficult to collect and inordinately expensive; its content of neutralizing antibodies appears to be less than that of normal serum,[19] and about 40 per cent of convalescents have no demonstrable antibody at all.[17] The financial burden on many patients with poliomyelitis is heavy enough without it.

This part of the discussion can well be closed with a quotation from Zinsser,[20] who after discussing experimental work on viral antibodies said: "All these considerations should especially influence clinical views on the therapeutic use of antiserum. . . . Much money, effort and heartache could have been saved if these experimental facts had been considered before wholesale treatment with convalescent serum was exploited."

TABLE 3.—*Preparalytic Cases: All Serum Treated; Outcome in Relation to Day of Treatment*

Onset of Meningitic State Before Treatment	Number	Percentage Developing Paralysis
Less than 1 day	802	4.1
1 day	913	5.5
2 days	652	6.7
3 days	283	17.0
4 days	125	12.0
5 days	78	14.1
6 days	50	18.0
More than 6 days	89	30.3
3 days or more	625	17.6
Entire epidemic	4,525	14.4

From Jensen.[10]

TABLE 4.—*Serum-Treated Preparalytic Cases: Relation of Dosage to Complete Recovery*

Dosage of Serum	Number of Cases	Percentage with Complete Recovery
30 cc. or less	98	83.7
30-60 cc.	381	77.7
Over 60 cc.	205	74.6

From Laidlaw.[15]

TABLE 5.—*Convalescent Serum Treatment in Preparalytic Stage: Series with Controls*

Authors	Number of Cases		Complete Recovery, Percentage		Deaths, Percentage	
	Controls	Treated	Controls	Treated	Controls	Treated
Park, W. H.: J. A. M. A. **99**: 1050, 1932; Fischer, A. E.: Am. J. Dis. Child. **48**: 481, 1934	404	539	80.7	79.5	1.24	3.90
Harmon, Krigsten and Harkins [17]	31	63	29.0	88.9	Not stated	
Mai, H.: München. med. Wchnschr. **85**: 393, 1938	15	26	26.7	30.8	Not stated	
Hyland, H. H.; Gardiner, W. J.; Heal, F. C.; Oille, W. A., and Solandt, O. M.: Canad. M. A. J. **39**: 1, 1938	32	26	31.5	34.6	0.94	1.15
Henningsen, E. J., and Rasch, G.: J. Hyg. **40**: 84, 1940	200	409	81.0	81.4	6.0	4.15
Total	682	1,063	74.9	78.5	3.14*	4.22*
Controls and treated combined	1,745		77.1		3.79*	

* Calculated from the 636 control and 974 treated cases in the series in which the deaths were reported.

ACTIVE IMMUNIZATION

A solid immunity against most virus diseases is conferred by an attack of the disease itself, but this is not true of all of them, the common cold being one exception. It may be conferred by an attack of a closely related disease, artificially induced, of which vaccinia against smallpox is the best example. It may also, as in the case of yellow fever, be induced by injection of an attenuated, nonpathogenic strain of virus.[21] Finally, in a few instances, among which influenza [22] and equine encephalomyelitis [23] are conspicuous, it may be induced by the injection of fully inactivated virus. The differences between viruses in respect to their immunizing qualities are striking, and a method found effective against one is unlikely to be effective against another.

Poliomyelitis has been intensively investigated in search of a method that will be both effective and safe,

17. Harmon, P. H.; Krigsten, W. M., and Harkins, H. N.: Problems Bearing on the Pathogenesis and Treatment of Acute Poliomyelitis, Illinois M. J. **73**: 195 (March) 1938.

18. Harmon, P. H.: Poliomyelitis, Am. J. Dis. Child. **47**: 1179-1255 (June) 1934.

19. Shaughnessy, H. J.; Harmon, P. H., and Gordon, F. B.: Neutralization of the Virus of Poliomyelitis by Human Serum, J. Prev. Med. **4**: 463 (Nov.) 1930.

20. Zinsser, Hans; Ender, J. P., and Fothergill, L. D.: Immunity: Principles and Applications in Medicine and Public Health, ed. 5, New York, Macmillan Company, 1939, p. 446.

21. Theiler, Max, and Smith, H. H.: The Use of Yellow Fever Virus Modified by In Vitro Cultivation for Human Immunization, J. Exper. Med. **65**: 787 (June) 1937.

22. Horsfall, F. L., Jr., and Lennette, E. H.: A Complex Vaccine Effective Against Different Strains of Influenza Virus, Science **91**: 492 (May 24) 1940.

23. Beard, J. W.; Beard, Dorothy, and Finkelstein, Harold: Vaccination of Man Against the Virus of Equine Encephalomyelitis (Eastern and Western Strains), J. Immunol. **38**: 117 (Feb.) 1940.

but Flexner [24] in 1935 came to the conclusion that these two basic requirements were mutually exclusive; any method that was effective had the danger of producing the disease, and all inactivated vaccine failed to protect satisfactorily. Olitsky and Cox [25] in the following year concluded their own experimental work by remarking: "A study of the recorded experiments of the past twenty-five years reveals that poliomyelitis virus itself is not a potent antigen, as are some other viruses; uniform protection is rarely brought about through its use."

It was at this period that two large scale experiments on active immunization of human beings [26] were terminated abruptly because of the dangers encountered.[27]

It has even been questioned [28] whether an attack of poliomyelitis gives a solid or lasting protection against future attacks; the number of second attacks of the disease in the same person may be large enough to agree with expectancy on the basis of no immunity from the initial attack. The point is not, however, proved.

Discouraging as past experience has been, the field of future investigation is far from being closed. The search for an attenuated living virus should go on.

A new line of investigation will be open when a method of artificial cultivation of virus is available which will supply large amounts of virus. It is reasonable to question whether the low antigenicity of the vaccines that have hitherto been used is simply qualitative; it may actually be quantitative and, if so, the use of larger doses might prove effective. Hitherto, as Sabin and Olitsky [29] found, it has been possible to grow poliomyelitis in vitro only on human embryonic tissue —a method of extremely limited value for quantity production.

It may be that success in preventing poliomyelitis will come not from the methods of classic immunology but from some simpler chemical procedure—whether it is use of hormones or vitamins or something else—that will modify intracellular metabolism so that the natural host cells will no longer be suitable for invasion and multiplication of virus. The conditions that make them suitable are narrowly limited and delicately balanced. The chemical differences in composition of the anterior horn cells, which are susceptible, and those of many other neurons which are not, cannot be very great, and there is reason to suppose that even in the former the implanted virus dies out in many cases by the process which Pette [30] calls autosterilization, without causing death of the cells. It does not appear to be beyond the range of possibility that physicians will some day know the secret of this process and perhaps learn how to control it.

2398 Sacramento Street.

24. Flexner, Simon: Concerning Active Immunization in Poliomyelitis, Science **82:** 420 (Nov. 1) 1935.
25. Olitsky, P. K., and Cox, H. R.: Experiments on Active Immunization Against Experimental Poliomyelitis, J. Exper. Med. **63:** 109 (Jan.) 1936.
26. Brodie, M., and Park, W. H.: Active Immunization Against Poliomyelitis, Am. J. Pub. Health **26:** 119 (Feb.) 1936. Kolmer, J. A.: Vaccination Against Acute Anterior Poliomyelitis, Am. J. Pub. Health **26:** 126 (Feb.) 1936.
27. Leake, J. P.: Poliomyelitis Following Vaccination Against This Disease, J. A. M. A. **105:** 2152 (Dec. 28) 1935.
28. Fischer, A. E., and Stillerman, Maxwell: Does an Attack of Acute Anterior Poliomyelitis Confer Adequate Immunity? Report of Four Second Attacks in New York City in 1935, J. A. M. A. **110:** 569 (Feb. 19) 1938.
29. Sabin, A. B., and Olitsky, P. K.: Cultivation of Poliomyelitis Virus in Vitro in Human Embryonic Nervous Tissue, Proc. Soc. Exper. Biol. & Med. **34:** 357 (April) 1936.
30. Pette, H.: Tierexperimentelle Studien zur Frage der "Viruswanderung" im Nervensystem: zusammenfassende Betrachtungen (Mechanismus der Wanderung), Deutsch. Ztschr. f. Nervenh. **122:** 221, 1931.

THE USE OF THE RESPIRATOR

JAMES L. WILSON, M.D.
DETROIT

I think it is clear to all that the subject of the use of the respirator is included in this program not because of its scientific importance as compared with the other matters discussed but because the respirator has aroused a great deal of interest and obtained a dramatic hold on the lay mind, and because the question of its use confronts a physician in respect to every patient who dies a victim of poliomyelitis.

The most important problem that arises, and the one that first enters the mind, is one for which I cannot offer a statistical answer, nor do I think it is worth long discussion here. The question concerns the ultimate value of the respirator in the treatment of poliomyelitis, and it arises because of the painful experience that physicians have had with patients who have survived after long and expensive dependence on a respirator but who are so extensively paralyzed that one can wonder as to the value of their lives to themselves or to others. In regard to these few patients one quickly moves into questions of philosophy and ethics which are not necessary to discuss here. One crucial point must concern the physician, one which I wish I could emphasize again and again: At the time that the decision to use the respirator must be made it is impossible to make an accurate prognosis as to the future value of the individual whose life the physician is trying to save.

A survey of all the patients with poliomyelitis treated in respirators in this country during 1940 has recently been made. It was impossible to make it complete or entirely accurate, but figures of considerable interest were obtained. Somewhere between 400 and 500 patients were treated last year. Of the patients for whom the use of the respirator was clearly indicated—that is those with simple intercostal or diaphragmatic paralysis, who made up one third of the total—less than 20 per cent died. It is evident that a great many patients recovered as competent individuals, but it is impossible from any data yet available to get figures which would quantitate the amount of permanent handicapping.

There were two important observations: one, that a large number of these patients had conditions for which the use of the respirator was probably not indicated; second, that a large number of patients were put in the respirator at periods of their illness far later than that which the best practice of medicine would demand.

Two thirds of the patients treated last year had bulbar paralysis; that is, they had pharyngeal paralysis. Of these, two thirds died. These patients have often severe respiratory difficulty, usually due to unswallowed pharyngeal secretions. Difficult breathing from this cause alone cannot be helped by a respirator. The use of the respirator is clearly indicated only when the difficulty is due to intercostal or diaphragmatic paralysis. However, it cannot be said that in many instances in which there is pharyngeal paralysis there is not actually weakness of the respiratory muscles as well, which would give indications for care with the respirator. The greatest clinical acumen is sometimes necessary to detect actual intercostal or diaphragmatic weakness when respiration is continually interrupted by unswal-

lowed pharyngeal secretions. Long periods at the bedside with careful observation of the breathing of the patients is necessary, because many with good respiratory muscles will breathe shallowly and will seem unable to take a deep breath when they have fear of choking on secretions from the upper respiratory tract. Often considerable help can be obtained by a careful examination for weakness of the shoulder muscles and for weakness of the neck, which are invariably associated with intercostal paralysis and with diaphragmatic paralysis.

One fourth of the patients were put in the respirator for the first time on the seventh day of their illness or later. Only one half were put in on the fourth day of their illness or earlier. This indicates a widespread delay in the institution of treatment and brings me directly to what I think is one of the most important rules to be followed for treatment with the respirator. Patients should be treated early. The validity of this rule must necessarily rest on the principle that underlies all orthopedic treatment, that which demands early protection by the use of splints or sandbags or casts of any paralyzed muscle. Although the theoretical basis for this principle of treatment is, I believe, not wholly clear, long experience has convinced all that it is sensible. Apparently one may expect less total paralysis and certainly less deformity by a rigid application of this principle of treatment. There is no reason why the same rule should not apply to the care of the intercostal and the diaphragmatic muscles as to care of the biceps. The respiratory muscles can be protected in a respirator. The parallelism between the action of a respirator and that of a splint is certainly not exact, but this machine gives the respiratory muscles the nearest possible approach to the rest given by a splint to a biceps. Here argument can quickly get involved with unproved theoretical considerations, but one would expect less use of sick anterior horn cells to occur with muscles passively moved than with those actively moved.

The use of the respirator in most physicians' as well as laymen's eyes is still limited to dire emergencies as a last and dramatic effort to preserve life. This necessarily restricts the interest in the use of the respirator to the most serious cases, in which actually, in terms of final competence of the patients, one can hope to accomplish the least. I believe, though I cannot prove it, that one would probably do more good and save more muscles by using a machine to give rest to several partially paralyzed patients who might well survive without the benefit of a respirator than to save the life of one terribly paralyzed.

Attempts to use the respirator early in disease brings one face to face with several practical problems.

The first involves a general principle of artificial respiration, which I will take time here to discuss. Artificial respiration of all types is most successfully carried out when the patient is making no attempt to breathe himself. A patient's own effort to breathe, particularly when it is irregular and interrupted, as in pharyngeal paralysis, may completely prevent any form of artificial respiration, certainly that with the Drinker type of respirator, from being effective. Anxiety and fright may prevent a patient from relaxing in a respirator and from getting any benefit from it. It follows, therefore, that when a respirator is used early, before the patient feels desperately in need of help, it is apt at first trial to seem ineffective. To use a respirator under these conditions requires a great deal of skill and patience, and sometimes several trials. All possible tact in handling an anxious, frightened patient is necessary.

A second problem is the diagnosis of early paralysis or the detection of partial paralysis of the respiratory muscles, a subject which deserves a longer discussion than can be afforded here. I have confidence that in orthopedic clinics all over the country there are numerous examples of undetected partial paralysis of intercostal muscles or of the diaphragm. The detection of early respiratory paralysis or one of moderate degree depends on accurate observation and on an evaluation of functional capacity which requires some experience. Often a sharp reduction in respiratory capacity is evidenced only by slight motion of the nostrils on breathing, or the patient may avoid speech, or talk only by interrupting each few syllables for a breath. Perhaps one of the simplest things to do is to ask a suspected patient to count and see how many numbers he can repeat with one breath. Cyanosis, severe dyspnea, air hunger—all are symptoms of a desperate need for oxygen, which when due to paralysis of the respiratory muscles indicates that the respirator should have been used long before.

A third problem brought about by early treatment arises because of the form of the machine itself, as it is large, cumbersome and frightening. What is more, if it is not available and at hand it is apt to be costly to make it so. The decision to move a patient to a respirator or a respirator to a patient is one that involves a great deal of expense, trauma and trouble and stirs up an intense anxiety and fear. It is hard to make that decision as early as it should ideally be made, especially if the only available respirator happens to be at a distance and it is obvious that some action needs to be initiated before it is quite clear that a patient will or does need a respirator.

I have no answer for this last problem except to hope that the new types of cuirass respirators will become cheap and effective. Unless some such development does take place or unless the present expensive and cumbersome tank respirators become far more common than they are at present, our lay public will continually be impressed by dramatic accounts of dashing ambulances with police escorts moving respirators or suffering patients, each incidence of which will probably indicate an unsatisfactory solution of an emergency which better should not have arisen.

Before I close, I must add one word about the treatment of victims of bulbar palsies, or more specifically those with pharyngeal paralysis. In any poliomyelitis epidemic these outnumber the patients with paralysis of respiratory muscles by a good deal. Since their difficulties are due to bulbar involvement, the respirator cannot help and may do harm. Although the discussion of this does not come within the topic assigned to me, I wish to emphasize that possibly more can be accomplished by properly handling these patients than those for whom the respirator is indicated. Postural drainage, gentle aspiration of the throat, avoidance of excitement, and even sometimes in very carefully studied instances, tracheotomy will do much to save life. The nonspecific treatment of bulbar poliomyelitis deserves more attention.

5224 St. Antoine Street.

EARLY ORTHOPEDIC CARE IN POLIOMYELITIS

C. E. IRWIN, M.D.
WARM SPRINGS, GA.

The type of orthopedic care indicated for those individuals who have recently experienced an attack of poliomyelitis is based on the pathologic processes in both the spinal cord and the skeletal muscles. It is essential to interpret correctly these pathologic processes in terms of the altered anatomy and physiologic function before effective treatment can be instituted. Furthermore, the degree of muscle improvement it is ultimately possible to obtain is determined by the severity and distribution of this pathologic condition.

The first objective in treatment is to preserve all potential neuromuscular units that remain anatomically intact and to maintain the skeleton in proper alinement while the protection of these units is being carried out. It is important to realize that intact anatomic units immediately after the acute disease cannot all function as physiologic units. A paralyzed muscle fiber will not contract until its physiologic processes have been restored, and its physiologic processes cannot be completely restored if there has been a break in the anatomic continuity.[1] By way of illustration, let me briefly review the acute pathologic process in the cord as far as it pertains to muscle function.

The anterior horn cells respond to the invasion of the virus in at least four ways:

1. Anterior horn cells remain normal, without involvement (fig. 1).
(*a*) Normal anatomic unit.
(*b*) Normal physiologic unit.

2. Anterior horn cells temporarily altered in function by edema and congestion of the acute inflammatory process (fig. 2).
(*a*) Anatomically the unit remains intact.
(*b*) Physiologic function of cell and neuromuscular unit temporarily shut off.

3. Partial destruction by toxin of virus (fig. 3).
(*a*) Anatomic continuity temporarily altered.
(*b*) Physiologic function diminished or absent.

4. Complete destruction (fig. 4).
(*a*) Anatomic continuity is broken.
(*b*) Restoration of physiologic function is impossible. In the reparative process the anterior horn cell is replaced by scar tissue. This scar tissue cannot generate or transmit nerve impulses. The axon or nerve fiber disintegrates. The representative muscle fiber undergoes fatty degeneration and ultimate fibrosis. No type of treatment will alter this condition.

How does the increase in muscle strength come about? The important point to be emphasized is that any increase in motor power that might occur in a given muscle or group of muscles of an individual during convalescence is not due to hyperplasia of either anterior horn cells or muscle tissue. The increase in muscle power comes from two sources (figs. 1, 2 and 3, upper strip), (1) the natural restoration of the physiologic function of the nerve cells of neuromuscular units temporarily thrown out of action by the acute disease and (2) hypertrophy of the muscle tissue of normal units that have been spared by the infecting organism. In both instances anatomic continuity has not been broken. Improvement in the spinal cord of this nature will take place regardless of whether or not any treatment is given. I believe that this type of improvement explains the rapid return of muscle power made during the first few weeks after an acute attack and explains why a patient eventually is able to live

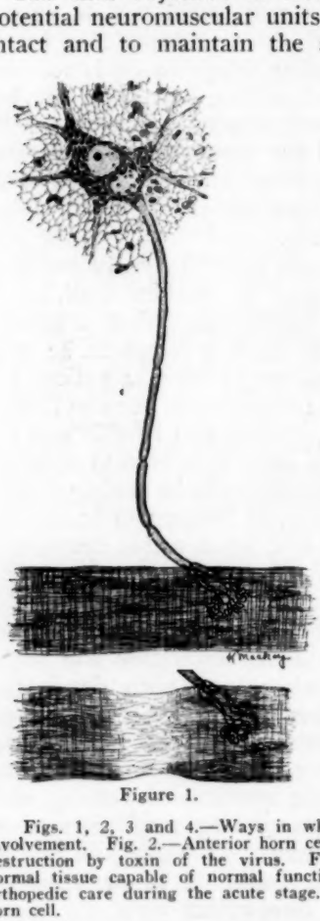
Figure 1.

Figure 2.

Figure 3.

Figure 4.

Figs. 1, 2, 3 and 4.—Ways in which anterior horn cells respond to invasion of virus: Fig. 1.—Anterior horn cell remains normal without involvement. Fig. 2.—Anterior horn cell temporarily altered in function by edema and congestion of the acute inflammatory process. Fig. 3.—Partial destruction by toxin of the virus. Fig. 4.—Anterior horn cell completely destroyed. The upper strip of muscles in these illustrations represents normal tissue capable of normal function. The muscle tissue in figures 1, 2 and 3 in the lower strip is pathologic because of lack of proper orthopedic care during the acute stage. In figure 4 the pathologic condition of the tissue is due to complete destruction of its representative anterior horn cell.

1. Hipps, H. E.: Muscle Pathology in Anterior Poliomyelitis: Its Relation to Function, South. M. J. **34**: 135 (Feb.) 1941.

without a respirator when it was necessary to save his life during the height of the acute illness. As soon as the edema and congestion subside a great number of anterior horn cells return to function.

If improvement in the cord takes place as just described, what is the purpose of early orthopedic care? As already stated, no type of treatment will alter those units which are completely destroyed. If the greater percentage of the total fibers of any muscle or groups of muscles is damaged to this extent, they will remain useless regardless of what is done. The object of treatment, then, is to protect the normal tissue that remains and to preserve anatomic continuity of all muscle fibers in which the representative nerve cells are potentially intact but are temporarily unable to function physiologically. When these two aims are properly carried out, all the potential strength of the patient has been preserved and his status, so far as muscle power is concerned, is established. He is now in the chronic stage of the disease. Without proper care and protection these muscle fibers are easily stretched even to the point of rupture (figs. 1, 2 and 3, lower strip). They are temporarily without tone, owing to loss of the normal nerve impulse. They are particularly vulnerable during this period. Once ruptured, the muscle fiber is invaded by scar tissue, and when the representative nerve cells regain their physiologic function a normal wave of muscle contraction is impossible owing to the break in anatomic continuity. This break in continuity can be brought about by overactivity, whether it is too deep and vigorous massage, overexercise, early weight bearing, inadequate support or overstimulation. If rupture in muscle fiber occurs, then hypertrophy is forever impossible.

Hipps[1] recently presented an interesting study of gross pathology of muscles in poliomyelitis. Through the courtesy of Dr. Hipps and the publishers two drawings are shown (figs. 5 and 6). These drawings were made from actual specimens at the time of operation. Note the zones of fibrosis completely traversing the muscle belly in both specimens. The quantity of muscle tissue actually present was estimated to be 90 to 95 per cent of normal but the functional power was only 20 per cent. This transverse zone of fibrosis can be explained by sudden trauma causing rupture of the fibers while they were lacking in tone because of temporary loss of function of the representative anterior horn cells. These drawings well illustrate the importance of meticulous care during the first few months.

All that has been stressed in this paper so far has been acutely diseased tissue. The treatment of acutely diseased tissue in poliomyelitis is no different from the treatment of acutely diseased tissue in any other illness. The first and most important indication is absolute and complete rest and no exercise. Exercise is contraindicated as much in these cases as in cases of acute myocarditis or overfeeding a patient with intestinal ulcerations following typhoid.

The entire treatment program for a patient who has had an attack of anterior poliomyelitis is adequately summed up in the diagram reproduced in figure 7. The program divides itself into three phases: (1) the treatment indicated during the acute stage, (2) that which is indicated during the chronic stage and (3) the treatment indicated during the period of resumed activity (fig. 7).

The orthopedic care during the acute phase is concerned with (1) the preservation of all the potential muscle power that has been spared by the acute infectious process and (2) maintenance of the skeleton in proper alinement while these potential neuromuscular units are being protected.

The treatment carried out during this acute phase is designed to salvage everything of value from the wreckage caused by the devastating invasion of the infecting organism.

When the patient is making no further improvement —when there is nothing more to salvage—the condition passes into the chronic stage. We are now concerned with bringing together, or assembling, all that has been salvaged and supplementing indicated surgical procedures and the fitting of permanent braces. The result is an individual who, though resembling his former normal appearance, is handicapped in varying degrees as to his former normal function. The patient is now

Figure 5.

Figure 6.

Fig. 5.—Muscle grade, trace. Zone of fibrofatty degeneration with good muscle above and below.

Fig. 6.—Muscle grade, poor. There is a zone of fibrofatty degeneration across a fairly good muscle. A contraction in either muscle belly is ineffectual because of this zone. This may have resulted from a stretch tear or perhaps from the pressure of the calf band or brace.

ready to resume his former activity as completely as is possible. As limited as it might ultimately be, the purpose now is to teach the patient as much independence as possible by instructing him to use to the best advantage all that has been saved and accomplished by treatment during the acute and chronic stages.

Only the principles of that treatment indicated during the acute stage will be discussed at this time. It is impossible to outline a treatment program for the acute convalescent stage that fits every patient. They are all individual problems. Complete rest is the basic principle of treatment which I wish to emphasize. This period of treatment may vary from a period of two months to as long as a year, depending on the distribution and the severity of involvement. The principle of rest should be continued as long as there is increase

in muscle power which later will be of some practical functional value to the patient. At the same time one must condemn prolonged treatment of this type on muscles or groups of muscles in which the strength has persistently remained less than 50 per cent. This is particularly true of muscles in the weight bearing extremities. It is useless to carry a severely damaged

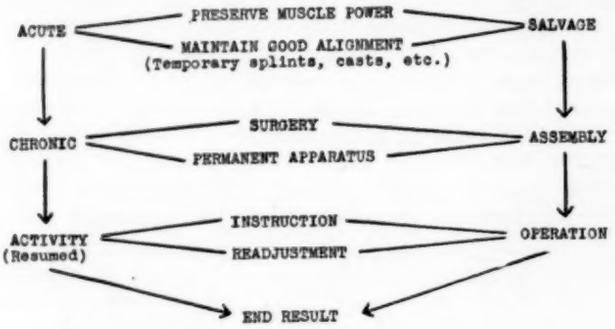

Fig. 7.—Treatment program.

muscle through a series of passive motions when actually there is no muscle tissue to exercise. This does not mean that all treatment indicated during the acute stage should be discontinued, the patient classed as chronic and immediately put on his feet with braces and crutches. As an example, one should discontinue treatment of lower extremities that remain flail but continue efforts directed at the trunk and upper extremities, which must later take over the function of weight bearing.

In addition to recumbence and non-weight bearing, adequate rest is best provided by plaster casts. Plaster has the advantage over removable splints in several ways. Nursing care of a patient in a properly applied cast is much easier. Casts are comparatively inexpensive and are more positive, and pressure is evenly applied over the entire extremity. The patient is more comfortable. No immediate attempt should be made to make a complete muscle analysis. It causes the patient too much discomfort and it can't possibly be correct. In cases of lower extremity involvement the hips, abdomen and lower part of the back are almost always involved. A well padded double spica is the most satisfactory method of providing adequate support. The body portion should extend well over the lower costal margins. This splints the abdomen and supports the back. The normal lumbar lordosis must be preserved. The thighs should be slightly internally rotated, the knees flexed 10 to 15 degrees, the knee and ankle joints maintained in the same vertical plane, and the feet in slight equinus and varus. In shoulder girdle involvement, casts are used as soon as the condition of the patient permits. A body jacket is applied including the arm as far as the elbow. Care must be taken to keep the shoulder tips depressed. The upper trapezius is almost always spared. Its unopposed action elevates the shoulder tip and rotates the scapula outward. The arm is placed in 60 degrees abduction and 45 degrees forward flexion. Never immobilize the fingers and hands in plaster. These joints should have some motion every day. When the physical condition of the patient will not permit plaster on the trunk and upper extremities, overhead slings are quite satisfactory (fig. 8).

As soon as tenderness subsides, a complete and accurate muscle analysis is essential. This test forms the basis of future treatment. If indicated, the casts are reapplied with the parts supported in the position the muscle weakness and imbalance require.

Exercises should not be started until improvement from immobilization ceases or restriction of joint motion becomes apparent. I feel that exercises following this period of prolonged rest are best provided in a medium of warm water. Hydrotherapy is often continued three or four months before weight bearing is started. I feel that further improvement in muscle power from hydrotherapy is due to hypertrophy of muscle tissue that remains.

For patients who need respirator care the abdomen should be splinted by a corset or suitable binder as soon as the physical condition will allow. If this is not done, the patient will become an abdominal breather and the chest wall will contract in the position it assumes at the end of expiration. If and when there is a return in power of the muscles of respiration, they cannot elevate the rib cage because of the contraction.

Much has been written on the formation of kidney stones following prolonged immobilization, the most recent article appearing in THE JOURNAL.[2] Frequent change in position and intake of large quantities of water aid in better drainage and prevention of stone formation. Roentgenograms of the kidney region at intervals should be made to detect these stones in the early stage.

No attempt has been made in this paper to describe in detail early orthopedic treatment of the poliomyelitis

Fig. 8.—Overhead sling.

patient. My purpose is to emphasize the importance of complete rest during early convalescence. During this period of complete rest, spontaneous recovery in muscle power takes place as described. Following this spontaneous recovery, supervised exercise in warm water further increases muscle power by hypertrophy of the muscle tissue that has been spared by the disease.

2. Boyd, M. L.: The Formation of Renal Calculi in Bedridden Patients, J. A. M. A. **116**: 2245 (May 17) 1941.

Clinical Notes, Suggestions and New Instruments

CARCINOMA OF THE ISLANDS OF LANGERHANS WITH HYPOGLYCEMIA AND METASTASIS TO THE LIVER

LEWIS B. FLINN, M.D.; GERALD A. BEATTY, M.D.; MILTON GINSBERG, M.D., AND FREDERICK A. HEMSATH, M.D.
WILMINGTON, DEL.

After the discovery of insulin in 1922 the signs and symptoms of acute hypoglycemia became well known. These, in cases of mild involvement, were weakness, perspiration and anxiety and in severe instances more serious mental changes, convulsions, coma and death. The mental changes have received more attention lately, especially in association with insulin therapy in some of the psychoses. Apparently the hypoglycemic effect on nervous tissue may reach a point at times which is irreversible. Malamud and Grosh [1] and Klein and Ligterink [2] have discussed this problem recently.

Hypoglycemia may be due to many causes—pituitary tumors; adrenal cortical tumors; advanced hepatic disease such as yellow atrophy, carcinoma or fatty infiltration in which 70 to 80 per cent of hepatic substance is replaced; cachectic states; excessive physical exercise, and, most spectacularly, to tumors of the island cells of the pancreas.

Since Harris [3] first described this condition as hyperinsulinism in 1924, the subject has received considerable attention in the literature. Wilder [4] gave an excellent review in 1936 and Whipple and Frantz [5] in 1935. The latter report covered 62 cases of tumor of the islands of Langerhans. The great majority of the tumors were benign adenomas. In certain instances it was difficult to determine whether the tumor was benign or malignant. Only three of those considered malignant had hepatic metastases. Apparently these tumors grow slowly and metastasize slowly. Howland, Campbell, Maltby and Robinson [6] reported in 1929 a case of islet carcinoma which was removed surgically, and the patient was still alive and well in 1939. No metastases to the liver were found at operation. Joachim and Banowitch [7] in 1938 reported a case of carcinoma of the islands of Langerhans without hepatic metastasis; the patient died six weeks after operation, and no autopsy was obtained. Hamdi [8] discovered an islet cancer at autopsy; there was no mention of hypoglycemia clinically, but the cancer did have hepatic metastases sections of which showed typical islet cells.

The first case in the literature of carcinoma of the islands of Langerhans with hypoglycemia and metastases to the liver was reported by Wilder, Allan, Power and Robertson [9] in 1927. They were able to make an extract from the hepatic metastases and by injection into rabbits produced an insulin-like reaction. This beautiful piece of work clearly proved the hyperinsulinism concept of Harris [3] and showed conclusively that the hypoglycemia in islet tumors is caused in large part by insulin produced without nervous control by the tumor cells rather than by a general stimulation by the tumor of the normal islet cells. In 1937 Cragg, Power and Lindem [10] reported another case in which an insulin-like substance was demonstrated in an alcoholic extract of the hepatic metastases. Reports of 2 other cases of hypoglycemia and metastasis to the liver have appeared in the literature—1 by Judd, Faust and Dixon [11] in 1934, in which no metastatic extract was made and 1 by Bickel, Mozer and Junet [12] in 1935, in which demonstration of insulin in the hepatic nodules was unsuccessful.

To these 4 cases, we now add a fifth.

REPORT OF CASE

History.—A white woman aged 45 of Scotch-Irish descent, a housewife, was admitted to the medical service on Feb. 25, 1940 in a semicomatose condition.

In the fall of 1939 the patient started to complain of abdominal pain after eating, especially after eating fried food. Sodium bicarbonate gave relief. After several weeks, in addition to the complaint just mentioned, she began to have spells of "faintness" with numbness about the lips and in her extremities, but she showed no loss of muscular power or complete loss of consciousness. She obtained complete relief from these attacks with the intake of warm drinks and food. During the two weeks prior to admission she had more frequent and longer attacks of faintness and at times had to be roused by physical stimulation applied by the family. On February 23 she went to bed feeling well and was apparently rational but failed to be aroused the next morning even with stimulation. During this attack she was unable to speak to or recognize any one, appeared rigid, had glassy, watery eyes and frothed at the mouth. She remained in this condition for about eighteen hours, after which she was able to walk with aid but could not speak or recognize members of her intimate family. When she failed to improve after twenty-four hours she was brought to the hospital.

TABLE 1.—*Blood Sugar Content*

Time	Blood Sugar, Mg. per 100 Cc.
9 a. m.	89
One-half hour after ingestion of 50 Gm. of dextrose	81
One-half hour after ingestion of second 50 Gm. of dextrose	153
One hour after ingestion of second 50 Gm. of dextrose	213
Two hours after ingestion of second 50 Gm. of dextrose	208
Four hours after ingestion of second 50 Gm. of dextrose	106

TABLE 2.—*Blood Chemistry*

2/28/40	Carbon dioxide combining power	60.3 vol. per cent
2/26/40	Blood urea nitrogen	11.0 mg. per 100 cc.
3/ 2/40	Blood chlorides (as NaCl)	503 mg. per 100 cc.
3/ 2/40	Blood calcium	10 mg. per 100 cc.
3/ 2/40	Blood phosphorus	2.8 mg. per 100 cc.
3/ 4/40	Blood cholesterol	147 mg. per 100 cc.
3/ 7/40	Icteric index	11.6

Cholecystotomy had been performed in 1922. The patient stated that the gallbladder was not removed at that time because there were "too many adhesions." In 1923 she fell down a flight of stairs, striking her head, but suffered no fracture of the skull. Her menstrual history had been entirely normal except that her two last periods had been rather prolonged but scant, and for this reason theelin was administered by her family physician.

Physical Examination.—The patient was moderately obese. When she was examined on admission she was lying quietly in bed, apparently stuporous, and staring into space. Her skin was warm and moist and showed no abnormalities except that there was a small amount of hair on the upper lip and a

From the Medical Service and Pathologic Laboratory of the Delaware Hospital.

1. Malamud, Nathan, and Grosh, L. C., Jr.: Hyperinsulinism and Cerebral Changes: Report of a Case Due to an Islet Cell Adenoma of the Pancreas, Arch. Int. Med. **61:** 579-599 (April) 1938.

2. Klein, F., and Ligterink, J. A.: Insulin and Cerebral Damage, Arch. Int. Med. **65:** 1085-1096 (June) 1940.

3. Harris, Seale: Hyperinsulinism and Dysinsulinism, J. A. M. A. **83:** 729-733 (Sept. 6) 1924.

4. Wilder, R. M.: Spontaneous Hypoglycemia, Internat. Clin. **3:** 143-163 (Sept.) 1936.

5. Whipple, A. O., and Frantz, V. K.: Adenoma of Islet Cells with Hyperinsulinism, Ann. Surg. **101:** 1299-1335 (June) 1935.

6. Howland, Goldwin; Campbell, W. R.; Maltby, E. J., and Robinson, W. L.: Dysinsulinism: Convulsions and Coma Due to Islet Cell Tumor of the Pancreas, with Operation and Cure, J. A. M. A. **93:** 674 (Aug. 31) 1929.

7. Joachim, Henry, and Banowitch, M. M.: A Case of Carcinoma of the Islands of Langerhans with Hypoglycemia, Ann. Int. Med. **11:** 1754-1759 (March) 1938.

8. Hamdi, H.: Ein insulargenetisches Pankreascarcinom (Insulom), Ztschr. f. Krebsforsch. **37:** 411-413, 1932.

9. Wilder, R. M.; Allan, F. N.; Power, M. H., and Robertson, H. E.: Carcinoma of the Islands of the Pancreas: Hyperinsulinism and Hypoglycemia, J. A. M. A. **89:** 348-355 (July 30) 1927.

10. Cragg, R. W.; Power, M. H., and Lindem, M. C.: Carcinoma of the Islands of Langerhans with Hypoglycemia and Hyperinsulinism, Arch. Int. Med. **60:** 88-99 (July) 1937.

11. Judd, E. S.; Faust, L. S., and Dixon, R. K.: Carcinoma of the Islands of Langerhans with Metastasis to the Liver Producing Hyperinsulinism: Report of a Case, West. J. Surg. **42:** 555 (Oct.) 1934.

12. Bickel, Georges; Mozer, J. J., and Junet, R.: Diabète avec dénutrition grave: Disparition de la glycosurie et atténuation progressive de l'hyperglycémie à la suite du développement d'un carcinome insulaire du pancréas avec métastases hépatiques massives, Bull. et mém. Soc. méd. d. hôp. de Paris **51:** 12-21 (Jan. 21) 1935.

masculine distribution of pubic hair. The pupils reacted sluggishly to light; the scleras and conjunctivas were clear. There was moderate edema of both retinas, but the disks and vessels appeared normal. Oral hygiene was poor. The tongue had a thick, whitish coating and the nasopharynx was moderately injected. Tonsils were present but were not hypertrophied. The neck was not rigid, the thyroid not enlarged and the trachea not deviated. Except for occasional subcrepitant rales at the base of the right lung, the lungs were clear. The heart showed no abnormalities clinically, and the pulse was regular in rhythm and of good quality. The blood pressure was 120 systolic and 80 diastolic. The breasts contained no masses. There was moderate distention of the abdomen but no rigidity. Two healed incisional scars were present over the lower part of the abdomen. The edge of the liver was palpable about two fingerbreadths below the right costal margin. No abnormal viscera or masses were felt on first examination, though subsequent examination revealed the presence of an irregular, ill defined mass in the epigastrium. There was moderate rigidity of the left extremities; the patient seemed to resist passive motion. Flexion of the left knee caused the patient to groan, though no evident abnormality was noted in this region. Deep and superficial reflexes were present, physiologic in reaction and equal on the two sides. Vaginal examination revealed no evidence of a malignant growth, no mass in the pelvis. Rectal examination gave negative results. There was constant urinary incontinence.

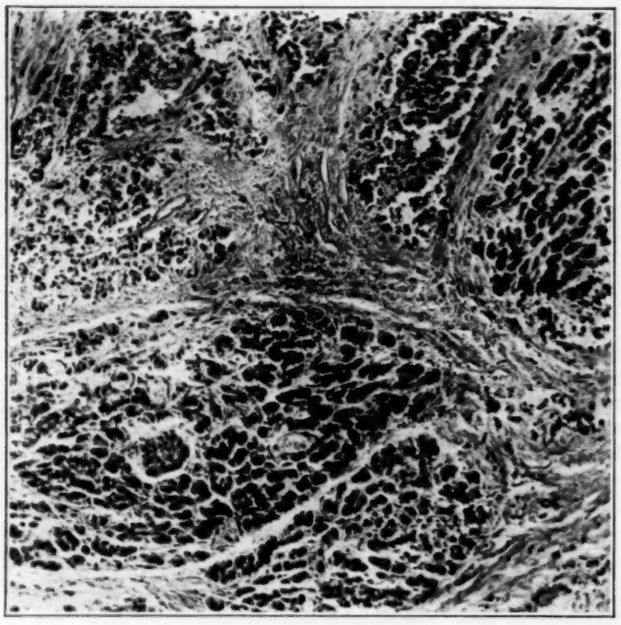

Fig. 1.—Pancreas with tumor adjacent to normal parenchyma; × 98.

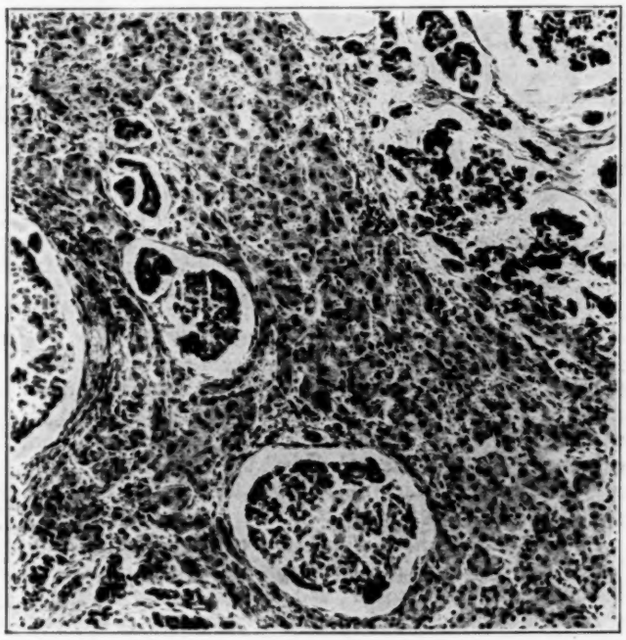

Fig. 2.—Liver with tufts of metastatic island cells; reduced from a photomicrograph with a magnification of 150 diameters.

Laboratory Reports.—A catheterized specimen of urine on February 25 was acid in reaction, with a specific gravity of 1.027, a faint trace of albumin but no sugar; there were 5 to 6 white blood cells in each high power field; no pus cells but occasional hyaline casts, much mucus and many epithelial cells were seen. Other specimens showed many pus cells. The urine showed no bile pigment and urobilinogen. The blood showed hemoglobin, 80 per cent; red blood cells, 4,500,000, and white blood cells, 14,300. The differential count showed polymorphonuclears, 58 per cent, of which 47 per cent were mature; 11 per cent band cells, 8 per cent large mononuclears, 33 per cent small mononuclears and 1 per cent basophils.

A determination of the blood sugar taken on admission was too low to read with accuracy, probably 20 mg. per hundred cubic centimeters, and another the following morning was 51 mg. per hundred cubic centimeters after intravenous intake of about 85 Gm. of sugar during the night. About two hours after injection of epinephrine plus 300 cc. of a 15 per cent dextrose solution, the blood sugar content was 125 mg. per hundred cubic centimeters, and six hours later it dropped to 29 mg. per hundred cubic centimeters. A dextrose tolerance test was performed on February 28. It was necessary to give the patient 8 ounces (240 cc.) of orange juice every three hours the preceding night to avoid coma.

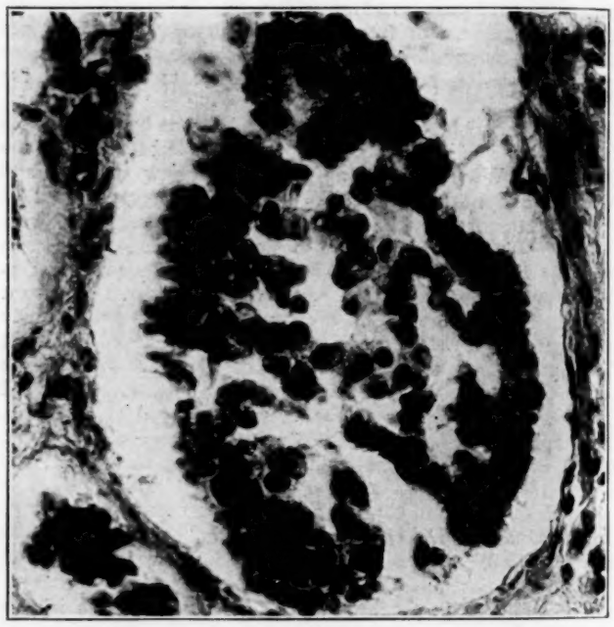

Fig. 3.—Hepatic metastasis; reduced from a photomicrograph with a magnification of 600 diameters.

The urine showed 3 plus dextrose in all specimens.

Bromsulphalein and galactose liver function tests were not made.

A chloride excretion test after the method of Cutler, Power and Wilder[13] to rule out adrenal insufficiency resulted as is shown in table 4.

The blood chloride content during the test was 561 mg. per hundred cubic centimeters. Fifteen grains (1 Gm.) of potassium citrate was given on the day before the test was started and repeated on the following day. Fluid intake on

13. Cutler, H. H.; Power, M. H., and Wilder, R. M.: Concentrations of Sodium, Chloride and Potassium in Blood Plasma and Urine of Patients with Addison's disease: Their Diagnostic Significance, Proc. Staff Meet., Mayo Clin. **13**: 244-249 (April 20) 1938.

the first day of the test was 2,700 cc. and 1,360 cc. for the remaining period of the test. Comparative figures showed a rather low urinary chloride content as a result of the aforementioned test. Adrenal insufficiency would give increased chloride excretion. A roentgenogram of the sella turcica showed no erosions of the clinoid processes or any evidence of pituitary tumor.

Course in Hospital.—The patient remained in a stuporous state for about seventy-two hours after admission, after which she became somewhat brighter but still was unable to speak coherently. However, she obeyed requests to turn her head or raise her arms. About twelve hours after the first spinal tap, she appeared even more bright and was coherent in her speech, giving a fair history of her condition in the past by answering simple questions. However, she soon lapsed back into the stuporous condition but was brought out of this with intravenous injections of dextrose and also with epinephrine.

The temperature, pulse and respiratory rate (except for a rise of the temperature to 103 F. due to acute pyelitis on the seventh day in the hospital) remained either within normal limits or went up only slightly throughout the course.

The blood sugar readings continued to remain low on most occasions, and after several weeks greater amounts of sugar were needed for regaining of consciousness. It soon became necessary to give continuous intravenous injections of sugar to keep the patient from entering the unconscious state, during which she would perspire freely, have occasional twitchings of the face and convulsive movements of the arms and legs.

Treatment consisted chiefly of increasing the blood sugar by direct infusions of sugar or by stimulation of reserves of glycogen with epinephrine. Stimulation during the drowsy, stuporous periods was afforded by giving moderate doses of amphetamine sulfate. Large doses of theelin in oil were given during the course because of a possible beginning of the menopause. A series of ten 1 cc. ampules of adrenal cortex extract and a course of twelve ampules of a gonadotropic extract of the urine of pregnant women (antuitrin S) given intramuscularly were tried. Neither of these seemed to have any influence on the patient's condition.

On March 30, in spite of the continuous intravenous therapy including increased sugar and stimulants, the patient lapsed into coma and failed to be roused. She began having frequent convulsive attacks, an elevated temperature and an increased pulse rate and died at 5:30 a. m., March 31.

Autopsy.—This was performed four hours post mortem.

Interest in this case was focused on the liver and pancreas. The peritoneal cavity was normal aside from easily separated fibrous adhesions in the region of the gallbladder and adhesions between the omentum and epigastric operative incision. A nodular tumor 6 cm. in diameter replaced the head of the pancreas but did not involve the common bile duct. The tumor showed a firm, pale gray, opaque structure. Adjacent infiltrated retroperitoneal nodes measured from 1 to 2.5 cm. in diameter. The body and tail of the pancreas were normal. Microscopic examination of the tumor (fig. 1) revealed masses and tufts of small cells of uniform size and structure closely resembling those from the islands of Langerhans. These were located in cystlike spaces or scattered through fairly dense fibrous tissular stroma. The metastases to the lymph nodes were similar to the primary tumor.

TABLE 3.—*Spinal Fluid Data*

3/2/40: Sugar, 74 mg. per 100 cc.; globulin, negative; 1 cell per c.mm.
3/6/40: Sugar, 71 mg. per 100 cc.; globulin, negative; 2 cells per c.mm.
3/4/40: Wassermann reaction negative
Colloidal gold curve negative
Pressure normal

The liver was enlarged (1,950 Gm.) with a nodular surface produced by numerous pale, slightly elevated and umbilicated nodules measuring up to 3 cm. Sections of the liver showed about half of its structure composed of these metastatic nodules. Microscopic examination (figs. 2 and 3) revealed the metastases as circumscribed masses of cells resembling islet cells within cystlike spaces formed by surrounding hepatic cells. Fibrous stroma was slight. Other metastases were not found.

The adrenal glands were enlarged to a weight of 7 and 9 Gm. and measured 6.4 by 3.2 by 1.4 cm. and 3.5 by 4 by 1.4 cm.

The left lung weighed 600 Gm. and the right 550 Gm. The left portion of the thorax contained a small amount of serofibrinous exudate. Atelectatic areas were present in the lower lobes and areas of congestion and early nodular consolidation in the upper portions of the lower lobes of the lungs.

Other conditions were normal or nonpertinent. Examination included the heart, gastrointestinal tract, gallbladder, spleen, kidneys, uterus and adnexa and the brain. The spleen weighed 150 Gm. The brain weighed 1,265 Gm. and showed a slight cone of cerebellar pressure. The pituitary gland was grossly normal.

TABLE 4.—*Excretion of Chlorides*

First 12 hour specimen, urinary chloride (as NaCl)	1.5 Gm.
Second 12 hour specimen, urinary chloride	1.1 Gm.
Last 4 hour specimen, urinary chloride	0.22 Gm.

Anatomic diagnoses were islet carcinoma of the head of the pancreas with regional and hepatic metastases, pulmonary congestion and early congestive pneumonia, serofibrinous pleurisy on the left side and adrenal hyperplasia.

COMMENT

In our patient, hypoglycemia was extreme, mental changes were definite, and operation was impossible, but typical islet-like cells in the hepatic metastases were found at autopsy. An extract of these metastases was not made. However, since the tumor cells in the liver were younger and more rapidly growing than in the original tumor and since the metastases constituted nearly 50 per cent of the substance of the liver, it is reasonably safe to assume, especially in the light of the cases cited at the beginning of this paper, that the rapid increase in the severity of hypoglycemia toward the end was due largely to insulin produced and liberated by the metastatic island cells in the liver rather than by stimulation by the tumor of the normal island cells in the pancreas.

503 Delaware Avenue.

ANURIA FOR NINETY-SIX HOURS IN A TWO YEAR OLD INFANT FOLLOWING SULFAPYRIDINE THERAPY

CARL L. WILSON, M.D., AND C. B. BILLINGSLEY, M.D.
FORT SMITH, ARK.

In the past eighteen months a number of reports have appeared in the literature regarding the possible renal complications of sulfapyridine therapy. By far the most serious of these is complete anuria with resultant uremia and death. Evidence has been presented by several authors to show that certain of the cases of anuria result from complete blockage of the lower part of the ureters by impacted crystals of acetylated sulfapyridine. In some instances relief has been obtained after cystoscopic manipulation and removal of the ureteral obstruction.

It is our purpose to offer additional evidence (1) that anuria following sulfapyridine therapy may be due to complete obstruction of the lower part of the ureters by sediment or crystals and (2) that cystoscopic investigation should be employed when such anuria occurs.

REPORT OF CASE

A boy aged 2 years became ill with cough, fever and chills on Dec. 8, 1940, and his family physician was called. The child was given 1 drachm (4 Gm.) of an alkaline preparation[1] every three hours for the next twenty-four hours, and fluids were forced. At that time a diagnosis of bronchopneumonia was made and sulfapyridine therapy was begun. Five-tenths Gm. was given immediately and was followed by 0.25 Gm. every

From the departments of Urology and Pediatrics of the Holt-Krock Clinic.

1. Citralka (Parke, Davis & Co.) was given, a preparation of citrates and tartrates of sodium and potassium together with salts of magnesium and calcium, 1 drachm (3.8 Gm.) of which has a systemic alkalizing effect equivalent to approximately 1 Gm. of alkali.

four hours. After five doses had been taken the child began to vomit and could no longer retain the sulfapyridine. In all, 1.5 Gm. of sulfapyridine had been retained as well as more than 10 Gm. of alkali. The pneumonia was progressing favorably, however, and an uneventful recovery was expected. On December 12, the mother reported that the child's urine was reddish and small in amount. During that day voidings were scanty and slightly bloody, and the last urination occurred on the following morning, December 13. No urine was passed during the next forty-eight hours.

The child was admitted to Sparks Hospital on December 15 at 5 p. m. Physical examination revealed him to be well developed, well nourished and mentally clear and alert. His pupils reacted well to light and in accommodation and his ears were normal. There was some congestion of the nasal mucosa, and the tonsils were enlarged and hyperemic. The pharynx was slightly inflamed. The cardiac borders were within normal limits, the rate was regular and the quality was good. No murmurs were heard. The lungs were clear except for scattered crepitant rales. No areas of consolidation were found. No organs, masses or tenderness could be found in the abdomen. The extremities were normal. All reflexes were physiologic, and there was no evidence of subcutaneous edema.

Examination of the blood revealed 85 per cent hemoglobin with 4,500,000 red blood cells, and 17,200 white blood cells were present with 62 per cent small lymphocytes, 4 per cent mononuclears, 32 per cent neutrophils and 1 per cent basophils. No urine could be obtained for routine examination. The temperature was 100.6 F., the pulse rate 100 and the respiratory rate 28.

At the time of admission no history of anuria was obtained, and sulfapyridine therapy for pneumonia was promptly begun along with sodium bicarbonate in adequate amounts. No urine was obtained that day, and on further questioning of the mother it was learned that the child had been anuric at home. Medication was discontinued at once, but by this time the patient had received an additional 3 Gm. of sulfapyridine.

The child was then given 10 grains (0.6 Gm.) of sodium bicarbonate every three hours and 500 cc. of Hartmann's solution daily, and fluids were forced by mouth. The first 500 cc. of Hartmann's solution was given intravenously, but the child became progressively edematous and veins were not available. It was then given subcutaneously. During the next forty-eight hours the patient's condition became progressively worse. The child became lethargic and drowsy. Great irritability was demonstrated on any attempt to disturb him, and all the subcutaneous tissues were waterlogged. Until this time cystoscopic examination had been withheld. It was feared that a general anesthetic given to a patient with pneumonia might result in a fatal outcome. However, after ninety-six hours of complete anuria the child's chances appeared so slim that cystoscopic examination was undertaken—almost as a last resort.

This was performed on December 17 under nitrous oxide-ether anesthesia without any respiratory difficulty. A no. 14 Butterfield cystoscope was passed easily. There was no urine in the bladder. The trigone and vesical neck were moderately inflamed, and several yellowish white "flakes" were adherent to the mucosa. These appeared to dissolve immediately in water. Both orifices were slightly inflamed but otherwise normal. There was no efflux noted from either orifice. No. 4 catheters were passed 12 cm. up each ureter, meeting temporary obstruction at 2 cm. on the left and almost impassable obstruction at 5 cm. on the right. A "gritty" sensation was felt during the passage of the catheters. No flow came from either catheter, but after washing with sterile water a hydronephrotic drip appeared from both. The catheters were then aspirated and 36 cc. of urine removed from the left renal pelvis and 19 cc. from the right. Both urine specimens were dark and cloudy. Examination revealed a few epithelial cells, many red blood corpuscles and 5 to 6 leukocytes per high power field in the specimen from the right kidney. The specimen from the left kidney showed approximately the same condition. No organisms were found in either specimen. Both specimens were alkaline in reaction, and the sediment of each contained "amorphous amber granules in moss-like arrangement." Typical sheaves of acetyl sulfapyridine crystals could not be found.

A plain roentgenogram of the abdomen was taken, and no evidence was seen of opaque calculi. Pyelograms were not made.

The catheters were left in place, and the patient was returned to his room. The catheters remained in place fourteen hours before slipping out, and during that time 1,225 cc. of urine was collected. In addition, the child voided in bed five times, and no record of the amount could be obtained. However, it seems clear that at least 2,000 cc. of urine was secreted during the twenty-four hours following cystoscopic examination.

During the next three days a moderate flare-up of the thoracic condition occurred, which undoubtedly was the result of the general anesthetic. It soon subsided, however, and during this time the child continued to void frequently and in large amounts. By the third day after employment of the cystoscope the subcutaneous edema had completely disappeared. At this time (December 30) examination of the blood revealed a nonprotein nitrogen level of 30.6 mg. per hundred cubic centimeters, and urinalysis was negative except for a trace of albumin, an occasional hyaline cast and 2 to 4 leukocytes per high power field.

The patient's convalescence was uneventful and he was discharged on December 24, a urinalysis the day before being completely negative.

COMMENT

There seems little doubt that this case of anuria resulted from obstruction in the lower part of the ureters. We feel that the obstructing concretions in all probability were composed of acetylated sulfapyridine. It is unfortunate that the typical sheaves of acetyl sulfapyridine crystals could not be demonstrated, but it is our feeling that this case agrees in every detail with those previously reported in which typical crystals were found.

It is interesting to note that this patient received adequate amounts of alkali throughout the course of the sulfapyridine therapy. Also to be observed is the fact that the urine aspirated from each renal pelvis at cystoscopic examination was alkaline. This merely reemphasizes the fact that little is known yet concerning the conditions under which sulfapyridine concretions are formed. The mere alkalization of the urine by means of large doses of sodium bicarbonate or similar drugs is not in itself a protection against the precipitation of concretions.

Not all patients displaying the symptom complex of pain in the loins and hematuria demand cystoscopic manipulation. Numerous patients have recovered from this complication without any therapy other than discontinuance of sulfapyridine and the forcing of fluids. It must be emphasized, however, that in these instances the concretions were situated in one or both renal pelves and were not in a position to block the urinary tract. After a few days these concretions dissolved in their alkaline surroundings, and the urinary symptoms disappeared. The case reported presented a more serious complication and demanded manipulation of the patient with a cystoscope. It corresponded closely to that reported by Tsao and his associates [2] In their case a child died because crystalline concretions formed at the ureterovesical orifices and completely blocked the ureters, resulting in anuria. We feel that our more fortunate experience resulted from the cystoscopic dislodgment of impacted crystals in the lower portion of the ureters with resultant reestablishment of urinary drainage.

SUMMARY

1. Complete anuria for ninety-six hours occurred during sulfapyridine therapy for pneumonia in an infant aged 2.

2. The anuria appeared to be the result of complete obstruction to the lower portion of both ureters.

3. Treatment with a cystoscope produced relief of the condition, probably by means of dislodgment of concretions impacted in the lower part of the ureters.

1425 North Eleventh Street.

2. Tsao, Y. F.; McCracken, Mary E.; Chen, Ji; Kuo, P. T., and Dale, C. L.: Renal Complications in Sulfapyridine Therapy, J. A. M. A. **113:** 1316 (Sept. 30) 1939.

Special Article

GLANDULAR PHYSIOLOGY AND THERAPY

GROWTH HORMONE OF THE ANTERIOR LOBE OF THE PITUITARY GLAND

HERBERT M. EVANS, M.D.
BERKELEY, CALIF.

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INTRODUCTION

Nutritional studies in the domain of the vitamins have long since shown the fallacy of designating any one of these factors as peculiarly growth promoting; as a matter of fact, growth cannot ensue with all of these factors present in a diet which is inadequate for proper nutrition. Just as normal growth is dependent on a multiplicity of these extrinsic factors, so also the same may be said as to intrinsic factors, for more than one of the glands of internal secretion can be shown to have very definite relations with growth. When the thyroid, for example, is removed from a young mammal, growth is always impaired; growth ceases abruptly after hypophysectomy. In the last-mentioned instance, the claim that the cessation of growth has resulted from the removal of a pituitary hormone essential for growth has only gradually gained validation.

As regards the nutritive, or extrinsic, factors influencing growth, the observation that there is, in fact, a lowered intake of necessary food ingredients in hypophysectomized animals may be paralleled with the observation that starvation of normal animals causes regressive changes in the gonads and thyroids resembling those produced by hypophysectomy.[1]

As regards the intrinsic factors essential for growth, it is, of course, conceivable that the stasis of growth after hypophysectomy is only secondarily due to the loss of the hypophysis, that primarily it is due to subnormality of one or more of the endocrine organs—the target organs—known to be directed by the pituitary. The production of excessive growth, or gigantism, by overconveyance of hypophysial hormones could be similarly explained as due to the administration of excessive amounts of the pituitary substances which affect certain target organs.

Fortunately it is possible to utilize crucial tests of the validity or invalidity of these explanations as to how the hypophysis regulates growth.

1. One can attempt to produce a restoration of growth in hypophysectomized animals or an overgrowth of normal animals by direct conveyance of one or more of the different principles secreted by the target organs, e. g., thyroxin, extract of adrenal cortex, sex steroids, insulin and others; or

2. One can attempt to bring about a restoration of growth in hypophysectomized animals or an overgrowth of normal animals by administering one or more of the special anterior pituitary principles affecting the target organs, e. g., extracts containing, respectively, the thyrotropic, lactogenic, adrenocorticotropic and gonadotropic factors; or

3. One can attempt to produce a typical restoration of growth in hypophysectomized animals or an overgrowth of normal animals with anterior pituitary extracts devoid of the four just mentioned factors that influence target organs or containing inconsequential amounts of them.

Much effort has been expended on such experiments.[2] The outcome indicates that growth-stimulating anterior pituitary extracts do not attain their result by virtue of their content of the four well known principles affecting target organs. The growth hormone is hence clearly separate from the target organ hormones.[3] An equally decisive answer cannot be given as to whether the promotion of growth by anterior pituitary extracts is due to one or more of the incompletely separated metabolic "hormones" of the anterior lobe, i. e., the ketogenic, glycotropic, glycostatic, contrainsular, diabetogenic, pancreatropic, nitrogen-retaining and other factors.

It will be the task of future research to investigate the metabolic effects of highly purified preparations containing the growth factors, but the results of such inquiries—whatever they may be—cannot be expected to invalidate the appropriateness of the term "growth hormone," a designation founded on the most obvious and remarkable effect of this substance—increase in body size. The inquiries in question may be expected, on the other hand, to elucidate the method of action of the growth hormone—a subject on which investigators are totally uninformed—and may hence contribute significantly to understanding of the biochemical mechanism of growth.

BIOASSAY

Efforts to purify extracts of the growth-promoting factor have hitherto employed almost exclusively the simple test of increase in the total body weight of the normal or the hypophysectomized animal (rat) during a stated interval of time. The Laqueur school has recently suggested certain features of skeletal growth as criteria for the potency of such extracts.

The tests employing gains in body weight, though abbreviated by many investigators, are time consuming for high accuracy unless considerable numbers of animals are employed for each dose level of each

From the Institute of Experimental Biology, University of California.

The publication of the above article was unavoidably delayed and is therefore not in its proper sequence in the series of articles for the second edition of Glandular Physiology and Therapy. It will appear under the section heading of Anterior Pituitary Gland in the bound volume.—ED.

1. Neither quantitative nor qualitative undernutrition has as yet been shown to produce the distinctive picture of hypophysectomy. The conveyal of the hypophysial growth hormone invariably increases food consumption, but no increase in the inflow of nutritive elements has as yet been shown to imitate the distinctive effects of the conveyal of the hypophysial growth hormone. M. O. Lee (Relation of the Anterior Pituitary Growth Hormone to Protein Metabolism, A. Research. Nerv. & Ment. Dis., Proc. (1936) **17**: 193-222, 1938) was the first to show that these effects can be detected in growth hormone–treated animals restricted to the same nutritive intake as untreated controls.

2. (*a*) Evans, H. M.: The Hypophyseal Growth Hormone: Its Separation from the Hormones Stimulating the Thyroid, Gonads, Adrenal Cortex and Mammary Glands, A. Research Nerv. & Ment. Dis. Proc. (1936) **17**: 175-192, 1938. (*b*) Evans, H. M.; Simpson, M. E., and Pencharz, R. I.: Relation Between the Growth Promoting Effects of the Pituitary and the Thyroid Hormone, Endocrinology **25**: 175-182, 1939.

3. Much confusion was introduced by the Riddle school (Bates, R. W., Laanes, T., and Riddle, O.: Evidence from Dwarf Mice Against the Individuality of Growth Hormone, Proc. Soc. Exper. Biol. & Med. **33**: 446-450, 1935. Schooley, J. P.; Riddle, O., and Bates, R. W.: Analysis of Pituitary Support of Growth of Body and Viscera in Pigeons, Anat. Rec. **72** [supp.]: 90, 1938) by the erroneous claim that this was not the case—a claim based on the promotion of growth in silver dwarf mice by a thyrotropic extract and in hypophysectomized pigeons by a lactogenic extract of the anterior lobe. The last-mentioned accomplishment has been repeatedly confirmed in this laboratory by the employment of a highly purified lactogenic extract, but no significant growth of hypophysectomized mammals is caused by this purified mammotropin at corresponding dose levels, whereas growth factor preparations devoid of lactogenic effects always promote marked growth of the hypophysectomized mammal at very much lower dose levels.

preparation. These difficulties have been somewhat lessened by the recent establishment of accurate graphs of the growth response.

Normal Versus Hypophysectomized Animals.—The young hypophysectomized rat has hitherto and correctly been regarded as the crucial test object for growth hormone research. It may, however, be allowable to point out that hypophysectomized animals suffer from many deficiencies. As was determined in the inception of growth hormone research, normal animals may be used for accurate tests of growth factor potency, provided female rats 5 months of age or older are employed. Such animals exhibit a "plateau of growth" but can be induced to grow rapidly by appropriate growth factor dosage. They are more resistant to the toxic effect of crude extracts and in general are hardier than hypophysectomized animals but are notably less sensitive than the latter to low dosage with the growth principle, as table 1 shows.

TABLE 1.—*Comparison of the Body Weight Increase of Normal "Plateaued" and of Hypophysectomized Female Rats Treated with Anterior Pituitary Growth-Promoting Substance ("Globulin" Fraction) for Ten Days*

Test Group	Animals	Daily Dose, Mg.	Weight Increase per Day, Gm.
Normal	63	1.0	2.93
Hypophysectomized	59	0.1	1.36

TABLE 2.—*Average Responses of Hypophysectomized Rats of Different Ages and Weights to an Anterior Pituitary Growth-Promoting Extract Given in Doses Proportional to Body Weight*

Experiment	Rats	Age, Days: At Operation	Age, Days: At Onset of Experiment	Body Weight at Onset of Experiment	Daily Dose, Mg.	Gain in Body Weight in 20 Days: Gm.	Gain in Body Weight in 20 Days: Percentage
I	12	28	56	72.8	0.100	29.4	40.4
	10	59-62	85-89	140.5	0.193	34.3	24.4
II	11	29-30	52	78.5	0.090	26.8	34.1
	12	62-63	82-83	143.3	0.164	22.3	15.6

Normal animals have the great advantage of possessing a hypophysis and hence possessing numerous hypophysial hormones—doubtless, some unknown—the absence of which in the hypophysectomized animal may possibly militate against the success of growth factor preparations as purification of these proceeds.

When hypophysectomized rats are given injections of growth-promoting extracts, males and females respond alike.[4] Advantage attaches to the choice of very young animals and to the allowance of a sufficient postoperative interval to establish that the operation has been complete—a fact disclosed by stasis of growth. For example, females 26 to 30 days old are hypophysectomized and an eight to ten day interval is allowed to elapse before injections of the growth-promoting extract are begun. Only those animals are employed for the test in which a gain of less than 6 Gm. in total body weight has ensued.[5] Greater increase in body weight is caused by the same dosage when the administration of the growth factor preparation is begun on the day of hypophysectomy.

Standard Growth Response Graphs.—It is now generally agreed that if a growth factor extract is given at various dose levels to groups of standardized animals, a straight line relationship exists between the logarithm of the dose level and the response in body weight.[6] The responses of normal "plateaued" female rats to growth factor preparations of differing potencies (A, B, C, D) have been charted in this way, and the resulting lines, representing the relation between the logarithm of the dose and the growth resulting, are approximately parallel (chart). When the dose levels are computed in "units" instead of milligrams of substance, the parallel lines coincide.[7] (The normal rat unit has been arbitrarily defined as the amount of any preparation that confers a gain of 40 Gm. in total body weight in a twenty-day period, seventeen injections, and the hypophysectomized rat unit, as that amount which confers a 10 Gm. gain in ten days, nine injections; the amount of substance required for unit response in the latter case is approximately one tenth that required in the former.) The straight line relationship between the response and the logarithm of the dose is valid only for a limited range of dose levels. This is true for hypophysectomized as well as for normal rats. The optimum range of responsiveness in body weight gain for the hypophysectomized animals is between 10 and 20 Gm. in ten days; that for normal rats is between 20 and 60 Gm. in twenty days.

Different periods of time have been proposed for these assays by different workers. Daily injections are given for periods ranging from three to twenty days. But when one studies the relationship between the logarithm of the dose and the response for a given preparation for periods ranging from five to twenty days, it becomes evident that the slope of the line increases with the period of time of the injections, at least up to fifteen days. Since the accuracy of the method will be the higher the steeper the slope of the curve, the advantage of using a fifteen day test as contrasted with shorter tests is obvious.

It has been suggested that it would be preferable to compute the body weight gain in per cent of body weight and, also, to administer the preparation in strict proportion to body weight.[8] If marked variations in body weight are encountered within experimental groups of rats of the same age, this might well be advisable. It is more important, however, to standardize both the age and body weight of experimental animals. That standardization of age is of primary importance is shown in table 2, from which it is evident that if rats are hypophysectomized at different ages, thus having different body weights, and are given injections, after the same postoperative periods, of doses proportional to their body weights, their gain is not the same even when computed as per cent of body weight, for the younger animals are more responsive.

4. Chou, C.; Chang, C.; Chen, G., and Van Dyke, H. B.: Observations on the Quantitative Assay of Growth-Promoting Extract of the Hypophysis, Endocrinology **22**: 322-334, 1938.

5. Under such circumstances the nose-anus dimension has usually remained constant, although an increase of 1 cm. in the anus–tail tip measurement is regular; the latter measurement may increase by 2 cm. in twenty days in young completely hypophysectomized females but is then at stasis.

6. (*a*) Bülbring, E.: The Estimation of the Growth Hormone of the Anterior Lobe of the Pituitary Body, Quart. J. Pharm. & Pharmacol. **11**: 26-33, 1938. (*b*) Evans, H. M.; Uyei, N.; Bartz, Q. R., and Simpson, M. E.: The Purification of the Anterior Pituitary Growth Hormone by Fractionation with Ammonium Sulfate, Endocrinology **22**: 483-492, 1938. (*c*) Fraenkel-Conrat, H. L.; Meamber, D. L.; Simpson, M. E. and Evans, H. M.: Further Purification of the Growth Hormone of the Anterior Pituitary, ibid. **27**: 605-613, 1940. (*d*) Fevold, H. L.; Lee, M.; Hisaw, F. L., and Cohn, E. J.: Studies in the Physical Chemistry of the Anterior Pituitary Hormones, ibid. **26**: 999-1004, 1940. (*e*) Light, A. E.; de Beer, E. J., and Cook, C. A.: Biological Assay of Anterior Pituitary Growth Hormone, Proc. Soc. Exper. Biol. & Med. **44**: 192-196, 1940. (*f*) Chou and co-workers.[4]

7. With W. Marx and M. E. Simpson I am preparing a paper on standardization of extracts containing the growth factor.

8. Chou and co-workers.[4] Light and co-workers.[6e]

Seasonal and Unaccountable Variations.—Every laboratory conducting routine growth factor tests has encountered annoying variations in the response of animals to a standard preparation at various times of year. In order to meet this difficulty, Light and co-workers [6e] stressed the importance of a standard reference preparation.

Skeletal Changes Due to the Growth Hormone.—It has been proposed by Freud and co-workers [9] that the increase in tail length rather than in body weight of hypophysectomized rats be used as the test for the effect of the growth extract. These investigators believe this to be a more specific and, thus, more reliable criterion for the effect of the growth-promoting substance. The method may possess advantages due to its specificity, but these are offset by the following considerations: Young untreated control animals show some continued tail growth for the first few weeks after complete hypophysectomy, and the additional effects produced by injections of the growth-promoting substance in a short test interval are not sufficiently great. Furthermore, the percental error of measurement is larger for the tail length increase than for the body weight gain. There is even some question as to whether the purified extract reported by Freud and collaborators to maintain normal growth in the tail is identical with the growth-promoting factor since it apparently had little or no effect on body weight in the treated animals as compared with untreated controls. The question demands further research.

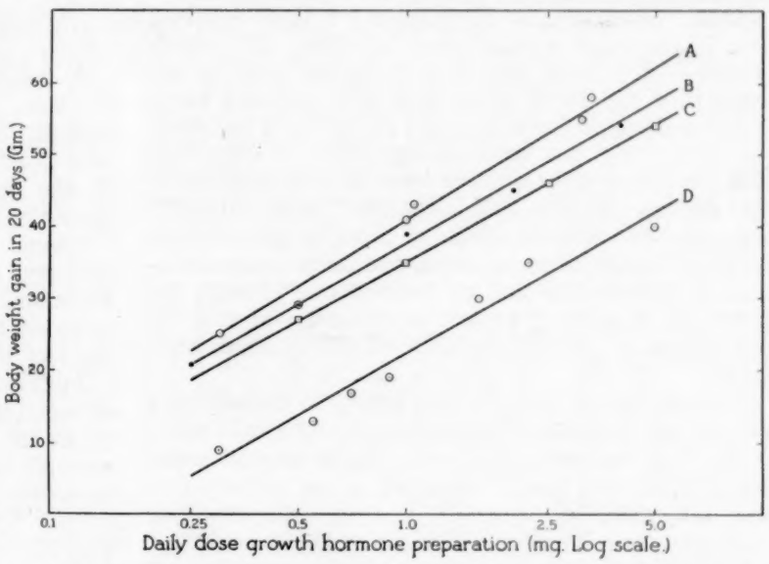
A more important proposal by the Amsterdam school relates to the proliferation of the cartilage of the epiphysial disk. This effect of the hormone is definite and easily demonstrable.[10] In hypophysectomized animals indubitable effects of the growth substance can be seen after three daily injections.[11] It must be emphasized that while the growth factor is chondrotropic, its effects are registered not solely by the proliferation of epiphysial cartilage cells but by the stimulus to all the normal processes of osteogenesis at the epiphysial-diaphysial junction.[12]

Conditions Necessary for the Continued Growth of Hypophysectomized Animals.—It has been repeatedly observed that hypophysectomized rats will at first respond maximally to partially purified preparations of the growth principle but will subsequently show less response or indeed exhibit growth stasis. Fortunately, the lessened response seldom or never occurs during the typical test period (ten to fifteen days), so that efforts to purify the preparation are not thereby impeded. It is improbable that the lessened response is associated with the development of an antigrowth substance, for potent crude extracts would be more prone to cause the development of antisubstances, and yet they permit continued and eventually gigantic growth of hypophysectomized animals. It is probable that hypophysectomized animals eventually need for growth more of their hypophysial hormones than the particular one—the growth hormone. This concept is supported by the fact that normal rats continue to grow for long periods when given injections of partially purified preparations that fail to give continuous growth in hypophysectomized rats. It remains for future research to disclose the identity of these cooperating hypophysial hormones, but the indications of their indispensability cannot invalidate the concept of the growth hormone itself.

PRESENT STATE OF PURITY AND CHARACTERISTICS OF GROWTH PROMOTING PREPARATIONS

Growth promoting preparations are at present generally made from fresh or acetone-desiccated anterior pituitary tissue by preliminary aqueous alkaline extraction followed by fractionation with ammonium sulfate.[6b,d] The precipitate formed at 0.4 saturation with ammonium sulfate is designated the globulin fraction. This fraction may be further purified by isoelectric precipitation. Such a product is still contaminated with the adrenocorticotropic and lactogenic factors and with smaller amounts of the thyrotropic and interstitial cell–stimulating factors. The latter three contaminants can be removed by cysteine treatment of the globulin fraction.[6e] These preparations contain 20 to 100 hypophysectomized rat units per milligram, the daily dose required for a daily gain of 1 Gm. in body weight (1 unit) varying from 10 to 50 micrograms. The Laqueur school [13] has employed different methods—adsorption on norite (a specially activated plant charcoal) and elution with phenol. Their methods have not yet been given complete publication. Although purified, the best growth promoting preparations cannot yet lay claim to being single homogeneous substances. The enumeration of chemical characteristics must be taken as applicable only to impure preparations. The analysis for nitrogen content, together with other analyses, indicates that one is dealing with a protein or a mixture of proteins.

The growth-promoting potency of preparations is greatly reduced or destroyed by boiling, and partial



Standard growth response curves; pituitary preparations of different growth-promoting potencies injected into normal "plateaued" female rats.

9. Freud, J., and Levie, L. H.: Hypophyse und Schwanzwachstum der Ratte. Ein Test für Wachstumshormon, Arch. internat. de pharmacodyn. et de thérap. **59:** 232-242, 1938. Freud, J.; Levie, L. H., and Kroon, D. B.: Observations on Growth (Chondrotrophic) Hormone and Localization of Its Point of Attack, J. Endocrinol. **1:** 56-64, 1939.

10. Ray, R. D.; Evans, H. M., and Becks, H.: Effect of the Pituitary Growth Hormone on the Epiphyseal Disc of the Tibia of the Rat, Am. J. Path., to be published.

11. Kibrick, E.; Becks, H., and Evans, H. M.: Article in preparation.

12. Ross, E. S., and McLean, F. C.: The Influence of the Growth Promoting Hormone of the Anterior Lobe of the Pituitary upon Growth Activity in the Long Bones of the Rat, Endocrinology **27:** 329-339, 1940.

13. Dingemanse, E., and Freud, J.: Purified Growth Hormone from Beef Anterior Pituitary, Acta brev. Neerland. **5:** 39 and 109, 1935.

destruction of potency occurs on subjection to temperatures above room temperature for several hours. Relatively crude preparations are stable in the cold in alkaline solutions up to p_H 11.0 but less stable or destroyed in acid solutions below p_H 4.0. The potency is reduced by the action of strong oxidizing agents, such as hydrogen dioxide (H_2O_2), but is more stable in the presence of reducing agents, such as cysteine, ascorbic acid and glutathione. Ninety-six per cent acetic acid, 90 per cent phenol and 50 per cent urea dissolve the substance and do not very appreciably reduce its potency within an hour or two.

METABOLIC EFFECTS OF GROWTH HORMONE

Among the earliest noted effects of the growth factor on metabolism was the action on protein or nitrogen metabolism, namely, the decrease of the nonprotein nitrogen and amino acid nitrogen of the blood and of urinary total nitrogen.[14] Consequently, the hormone has been considered by some as gaining its effects primarily "by increasing the amount of nitrogenous material available for cell growth and multiplication." [14g]

Reiss, Schwarz and Fleischmann[15] have reported that in dogs and rabbits after injections of "growth hormone" the blood urea was increased while at the same time the blood nonprotein nitrogen and blood arginine dropped from 10 to 50 per cent. They made the interesting but inadequately founded suggestion that the hormone is effective by activating arginase in the tissues. Mirsky and Swadesh[16] and Mirsky[17] suggested two distinct effects of anterior lobe extracts on protein metabolism, a direct one on protein catabolism in the muscles and an indirect one through the pancreas, stimulating protein anabolism, and that the stimulation of growth depends on this pancreatropic effect.

The relations of anterior lobe factors to carbohydrate metabolism (not here discussed) represent a field which is far from complete elucidation, but it may be noted that Shipley and Long[18] have felt it not unlikely that the ketogenic, diabetogenic and growth-promoting hormones are identical. Greaves and co-workers,[19] who partially purified preparations of the respiratory quotient–reducing and ketogenic factors, suggested that these are related to the growth hormone, since in their procedures of purification the potencies of the three principles ran parallel. The complexities of the situation may be further illustrated by the fact that Marks and Young[20] have recently shown that certain anterior lobe extracts increased the insulin content of the pancreas of the rat to almost twice normal values. In ammonium sulfate fractionation of these extracts the insulin-increasing (pancreatropic) substance accompanied the diabetogenic and growth-promoting factors, but the investigators did not consider it to be identical with either of these substances, for extracts could be made from commercial dried anterior lobe powder which had insulin-increasing but not diabetogenic or growth-promoting properties. Nor did they feel that diabetogenic and growth-promoting hormones were identical, for "stale" crude extracts of fresh anterior lobe tissue were not diabetogenic though growth promoting and insulin increasing.

It should be stressed that the studies of the metabolic effects of growth hormone have hitherto been performed with relatively crude preparations. The study of the metabolic effects of highly purified growth hormone preparations is urgently demanded and will occupy the attention of the immediate future.

RELATION OF ANTERIOR PITUITARY GROWTH HORMONE TO OTHER HORMONES

A functional thyroid gland, or the presence of its products, is clearly important in the regulation of growth. Young thyroidectomized animals cannot undertake normal growth, evidently because of impairment of the hypophysis, which exhibits no eosinophilic elements and presumably does not secrete growth hormone. Normal or better than normal growth is conferred on such animals by the injection of an extract containing the growth factor. Conversely, thyroxin improves the growth secured with standardized preparations of the growth substance.[21]

Inhibition of growth results from administration of estrone (theelin) in high doses,[22] which may be assumed to divert the pituitary gland from the secretion of growth hormone, although the consequent pituitary hypertrophy indicates the assumption of other activities on the part of the gland. Testosterone in high doses also inhibits growth but in low doses may be stimulating to the pituitary and secondarily to growth.[23] The smaller size of the female among mammalia may be related to the inhibition of growth by estrone and the greater size of the male to the stimulation of growth by testosterone.

Both adrenocorticotropic hormone and some of the cortical principles of the adrenal gland when given in high doses inhibit somatic growth in young rats.

Thymus extracts have been claimed to stimulate growth, though this has not been adequately confirmed. Certain it is that thymic hypertrophy is always seen in animals which have responded to growth promoting extracts, which may hence be said to be "thymotropic."[24] Yet as Reinhardt and co-workers[25] have

14. (*a*) Teel, H. M., and Watkins, O.: The Effect of Extracts Containing the Growth Principle of the Anterior Hypophysis upon the Blood Chemistry of Dogs, Am. J. Physiol. **89:** 662-685, 1929. (*b*) Teel, H. M., and Cushing, H.: Studies in the Physiological Properties of the Growth-Promoting Extracts of the Anterior Hypophysis, Endocrinology **14:** 157-163, 1930. (*c*) Gaebler, O. H.: Some Effects of Anterior Pituitary Extracts on Nitrogen Metabolism, J. Exper. Med. **57:** 349, 1933. (*d*) Lee, M. O., and Schaffer, N. K.: Anterior Pituitary Growth Hormone and the Composition of Growth, J. Nutrition **7:** 337-363, 1934. (*e*) Gaebler, O. H.: Effects of Thyroparathyroidectomy and Carbohydrate Intake on the Action of Anterior Pituitary Extracts, Am. J. Physiol. **110:** 584-592, 1935. (*f*) Eyres, G. B., and Lee, M.: Determination of the Nitrogen Partition in Tissues, J. Biol. Chem. **115:** 139-148, 1936. (*g*) Howes, N. H.: Anterior Pituitary and Growth in the Axolotl (Amblystoma Tigrinum [Green] Neotenic Form): II. The Effect of Injection of Growth-Promoting Extracts upon the Utilization of Food, J. Exper. Biol. **15:** 447-452, 1938. (*h*) Lee.[3]

15. Reiss, M.; Schwarz, L., and Fleischmann, F.: Beiträge zur Beziehung zwischen Hypophysenvorderlappenwachstumshormon und Eiweissstoffwechsel, Endokrinologie **17:** 167-170, 1936.

16. Mirsky, A., and Swadesh, S.: The Influence of Anterior Pituitary Gland on Protein Metabolism, Endocrinology **25:** 52-56, 1939.

17. Mirsky, A.: The Influence of the Anterior Pituitary Gland on Protein Metabolism, Endocrinology **25:** 52-56, 1939.

18. Shipley, R. A., and Long, C. N. H.: Studies on the Ketogenic Activity of the Anterior Pituitary: I. The Relation of Ketonaemia to Ketonuria in the Rat; II. A Method for the Assay of the Ketogenic Activity; III. The Nature of the Ketogenic Principle, Biochem. J. **32:** 2242-2256, 1938.

19. Greaves, J. D.; Freiberg, I. K., and Johns, H. E.: Preparation and Assay of Anterior Pituitary Fractions Rich in Ketogenic and Respiratory Quotient-Reducing Substances, J. Biol. Chem. **133:** 243-259, 1940.

20. Marks, H. P., and Young, F. G.: The Hyophysis and Pancreatic Insulin, Lancet **1:** 493-497, 1940.

21. Smith, P. E.: Increased Skeletal Effects in A. P. Growth-Hormone Injections by Administration of Thyroid in Hypophysectomized, Thyro-Parathyroidectomized Rats, Proc. Soc. Exper. Biol. & Med. **30:** 1252-1254, 1933. Evans and co-workers.[21]

22. Zondek, B.: The Inhibitory Effect of Follicular Hormone on the Anterior Lobe of the Pituitary Gland, Lancet **1:** 10-12, 1936; Impairment of Anterior Pituitary Functions by Follicular Hormone, ibid. **2:** 842-847, 1936.

23. McEuen, C. S.; Selye, H., and Collip, J. B.: Effect of Testosterone on Somatic Growth, Proc. Soc. Exper. Biol. & Med. **36:** 390-394, 1937.

24. Uyldert, I. E., and Freud, J.: Thymus Weight of Normal and Hypophysectomized Rats and the Influence of Anterior Pituitary Extracts, Acta brev. Neerland. **8:** 188-190, 1938.

25. Reinhardt, W. O.; Marx, W., and Evans, H. M.: Effect of the Pituitary Growth Hormone on the Thymectomized Rat, Proc. Soc. Exper. Biol. & Med. **46:** 411-415, 1941.

recently shown, the thymus gland is not necessary for the action of the growth hormone.

CLINICAL EMPLOYMENT OF EXTRACTS CONTAINING THE GROWTH-PROMOTING SUBSTANCE

The therapy of uncomplicated dwarfism in children will undoubtedly be greatly aided by purification of extracts containing the growth-promoting substance. In some instances crude extracts have been recommended, through belief that long-continued response is more apt to occur with them than with highly purified preparations, but the disadvantages of crude extracts are manifold. The quantities injected must be large, and undesirable consequences may ensue, such as gonadotropic and diabetogenic effects. The extracts already available have demonstrated that dwarfed children can in some cases be made to resume a growth as rapid as that characterizing the earliest epochs of childhood, and a considerable number of such children have now been treated for their dwarfism with partial or complete success.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORTS.

HOWARD A. CARTER, Secretary.

VAPOR-ALL VAPORIZERS, MODELS EV8 AND EV14 ACCEPTABLE

Manufacturer: The Kitchen Katch-All Corporation, Greenwich, Ohio.

The Vapor-All Vaporizers, Models EV8 and EV14, are designed to be used as inhalator-humidifiers. Heating elements incorporated in the units operate on alternating current, 115 volts, and are provided with thermostats for controlling the current, which will be automatically turned off if the water container has boiled dry. The water level is visible through a glass container. Directional vapor tubes, bottles, medicine cup, clamps, carrying-handles and cords are supplied with the devices, which have polished copper boilers trimmed with aluminum.

Vapor-All Vaporizers, Models EV8 and EV14.

Vaporizer Model EV8 will operate for six hours without interruption and the EV14 for ten hours. A fountain feed supplies a flow of water to the heater, and medicated inhalations are provided for by use of a separate medicine chamber.

The Council voted to accept the Vapor-All Vaporizers, Models EV8 and EV14, for inclusion on its list of accepted devices.

DRIFLASH ELECTROSURGICAL UNIT MODEL C-101, BIPOLAR, ACCEPTABLE

Manufacturer: General Automatic Corporation, Macedonia, Ohio.

The Driflash Electrosurgical Unit, Model C-101 for bipolar use, is designed for all types of minor surgery involving electrocoagulation within the power limits of the device. The firm states that the technic used is known as biterminal coagulation, where coagulation occurs only in the small area between the two active electrodes. The unit, which is similar in appearance to the Council accepted Model C-100 Driflash for monopolar technic, is housed in a molded plastic case with a hanger so that it may be hung on the wall. A foot switch operates the unit, and a pilot light indicates when it is energized.

Driflash Electrosurgical Unit, Model C-101, Bipolar.

In investigating the device clinically the Council found that, when small lesions of the skin are treated with the monopolar current and that when use of the bipolar coagulating current is limited to similar small areas such as hemorrhoids and tonsils and the areas of these further limited to the width of the electrode, the device will give satisfactory service. The monopolar current is a true desiccating current, and the coagulating current is satisfactory when limited to the area of the electrodes supplied with the apparatus.

The Council on Physical Therapy voted to accept the Driflash Electrosurgical Unit, Model C-101 for bipolar use, for inclusion on its list of accepted devices.

RADIO-EAR ELECTRONIC 41 HEARING AID ACCEPTABLE

Manufacturer: E. A. Myers and Sons, Inc., 306-308 Beverly Road, Mount Lebanon, Pittsburgh.

The Radio-Ear Electronic 41 Hearing Aid is a vacuum tube instrument and consists of the following parts:

(*a*) Combined microphone and vacuum tube unit M-5430 with volume control switch and battery "economizer." This combination is 3¼ by 1¾ by 5/8 inches and weighs 83 Gm.

(*b*) The A battery is a special Radio-Ear 728, 1.5 volts cell, 1 inch in diameter by 3⅞ inches long. The B battery, Radio-Ear 729 is 4⅝ by 1¾ by 1 inches. The combined weight of batteries is 308 Gm. Connections are made by means of a special three prong plug connector.

(*c*) Midget receiver R-3922, ¼ by 11/16 inches, weighing with earpiece 11.0 Gm. Bone conduction receiver B-2046, 1½ by ¾ by 5/8 inches weighing 22 Gm.

The Council's investigation of the device reveals that:

Battery Drain.—With new batteries giving full voltage, the current drains are as shown in table 1.

TABLE 1.—*Current Drains at Full Voltage*

Battery	Economizer Position	Voltage	Current
A.....	Battery used	1.5	100.00 ma.
B.....	Battery used	34.5	1.70 ma.
A.....	Battery new	1.5	85.00 ma.
B.....	Battery new	34.5	1.55 ma.

TABLE 2.—*Sound Intensity Amplification*

	128	256	512	1,024	2,048	4,096
At normal ear threshold....	?	22	27	40	40	22
At approximately 45 decibels above normal threshold...	?	8	22	40	44	5

Mechanical Features.—The instrument is neat in appearance and the parts are substantially made. With close fitting of the earpiece, the instrument is stable and without "feedback squeals" with volume control set as high as seven eighths of full volume.

Radio-Ear Electronic 41 Hearing Aid.

Performance tests were made with the economizer set in the "used battery" position and with the tone control set on the white dot.

Amplification.—The instrument showed the over-all sound intensity amplification given in table 2.

The Council voted to accept the Radio-Ear Electronic 41 Hearing Aid for inclusion on its list of accepted devices.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, JULY 26, 1941

THE VALUE OF RESPIRATORS IN POLIOMYELITIS

At least six hundred and eighty mechanical respirators are available in the United States. An estimate of their value in poliomyelitis, subject to the limitations of the questionnaire method, was obtained by Wilson [1] for the National Foundation for Infantile Paralysis. Replies to the questionnaire were received concerning four hundred and twenty of the respirators owned by three hundred and thirty-five hospitals, other institutions or individuals. The purposes of the survey were (1) to determine the total number of patients with poliomyelitis treated by means of respirators in the year 1940, (2) to determine to what use available respirators have been put, (3) to obtain some idea of the use of the respirators for patients other than those with poliomyelitis and (4) to attempt to evaluate the accuracy of diagnosis and of judgment shown in selecting the right type of patient to be placed in a respirator.

Of the three hundred and thirty-five returns, one hundred and thirty-two reported having had patients with poliomyelitis treated in respirators, with a total of 331 patients. Wilson believes that between 400 and 500 patients with poliomyelitis were treated in respirators in the United States during 1940. In addition to the 331 patients with poliomyelitis who were treated, 136 patients with other diseases were placed in respirators. Twenty-nine per cent of the victims of poliomyelitis were under 10 years of age, 41 per cent between 10 and 20 years of age and 30 per cent over 20 years. Only 52 per cent of patients with poliomyelitis were placed in respirators on the fourth day of the disease or earlier, whereas 25 per cent were put in the respirator on the seventh day of their disease or later. Apparently there is a surprisingly high incidence of respirator patients in the older age groups and a large percentage of patients not treated with respirators until comparatively late. Possibly a considerable number of these patients were neglected and should have had respirator treatment earlier.

1. Wilson, J. L.: Abstract of Report of Respirator Survey for the Year 1940, the National Foundation for Infantile Paralysis, Inc., Dec. 31, 1940.

Of the total number of patients with poliomyelitis reported, over 60 per cent (204 patients) were stated to have the "bulbar" form of the disease or it was indicated that they had difficulty in swallowing. Many of these patients probably should not have been put in respirators, but this cannot be definitely stated because the bulbar symptoms, which cannot be helped by respirators, may have been associated with paralysis of the respiratory muscles, which can be so helped. Of the 204 patients stated to have the "bulbar" form of the disease or indicated as having difficulty in swallowing, all but 17 were reported as having intercostal or intercostal and diaphragmatic paralysis. Patients who have trouble with swallowing often breathe irregularly and shallowly and act as if they have intercostal paralysis when actually they do not. Hence many of these cases were no doubt inaccurately diagnosed. Twelve patients were reported as having difficulty in swallowing but were not stated to have the "bulbar" form of the disease; these were wrongly diagnosed. Twenty-eight were stated to have the "bulbar" form without difficulty in swallowing being noted; all of these but 8 were recorded as having intercostal or diaphragmatic paralysis. The accuracy of these reports can likewise be justifiably doubted. A question was asked about the paralysis of the deltoid muscles. Although it is well established that intercostal paralysis rarely occurs without associated paralysis of the deltoids or upper arms, 40 cases were recorded in which intercostal paralysis was reported without indication of deltoid paralysis. This number is more than would be expected and probably is inaccurate. The remaining 101 patients were indicated as having had paralysis of the intercostal muscles or the diaphragm but were not reported as having difficulty in swallowing or were not stated to have the "bulbar" form of the disease. Thirty-three of these were indicated as having intercostal paralysis alone. Three cases of diaphragmatic paralysis were reported, but this cannot be challenged because, although this condition is rare, a few could be expected.

The data obtained, while not conclusive, are suggestive. Of the 331 patients with poliomyelitis treated in respirators, 150, or 45 per cent, died. One hundred and twenty-seven of the 150 fatal cases were those reported as having the "bulbar" form of the disease or as having difficulty in swallowing. Of the 204 "bulbar" patients 127 died, a fatality rate of 67 per cent, while of the 127 nonbulbar patients 23 died, a fatality rate of 19 per cent. The high mortality in the "bulbar" groups is to be expected. Many of the patients who died were in the machines only a short time and probably could not have been expected to be materially helped.

There were reports of frequent lending of machines from one hospital to another; although commendable, it is evident that in some instances dependence on a borrowed machine must mean confusion and delay in instituting treatment.

From this analysis, apparently the practical aspects of the use of respirators for the respiratory paralysis of poliomyelitis is not always satisfactory. Patients with the "bulbar" form of the disease are given respirator treatment in some instances in which such treatment cannot be expected to be of benefit. Diagnosis and judgment related to the employment of respirators should be much improved. Finally, the delay in initiation of respirator treatment appears to be, in many instances, much greater than could possibly be warranted. Although Wilson's report does not make the definite statement, it is clear that the use of respirators for poliomyelitis is often disappointing. Experience with this device certainly does not approach the high expectations for saving lives which were originally anticipated.

BOVINE BLOOD GROUPING

Experimental evidence recently developed leads to the conclusion that there are at least eighteen heritable blood groups in domestic cattle. Indeed, Ferguson [1] of the University of Wisconsin Department of Veterinary Science believes there are as many groups in cattle as there are bovine chromosomes.

Following Landsteiner's demonstration in 1900 of incompatibilities in blood transfusion in man, numerous attempts were made to determine whether similar blood groupings occur in domestic animals. Ottenberg and Friedman,[2] for example, showed that relatively sluggish intergroup isoagglutination does occur in cattle. Fishbein [3] confirmed this observation and concluded from his more extensive series of tests that bovine isoagglutinins are so irregular in titer and distribution as not to allow definite blood grouping. The practical importance of blood incompatibility in veterinary science was shown by Panisset and Verge,[4] who found that serious toxic reactions were occasionally produced in therapeutic blood transfusions in cattle.

The technic for determining incompatibility used by these earlier investigators was the relatively crude in vitro technic of spontaneous agglutination. A more delicate method of reinforced (or centrifugalized) agglutination was afterward introduced by Levine and Mabee,[5] by means of which improved technic Little [6] was able to demonstrate three principal blood groups in domestic cattle, with numerous anomalous reactions suggesting additional groups. Much more reliable specificity studies were afterward made possible by the introduction of the technic of immune isohemolysins. With this technic the Wisconsin veterinarian made four intravenous injections at weekly intervals of 1 liter of citrated daughter blood into the mother and withdrew presumptive isoimmune serum five days after the fourth injection.

Anaphylactic-like symptoms were noted in several of the cows when transfusion was done subsequently. These symptoms were apparently identical with those occasionally noted in human patients after repeated blood transfusions from the same donor.[7] Ferguson's erythrocytic classification was based on isohemolytic titer. To determine this titer two volumes of serially diluted maternal isoimmune serum were added to 1 volume of 2.5 per cent suspension of washed daughter corpuscles, and hemolysis was brought about by the addition of 1 volume of normal rabbit complement. The degree of lysis was estimated at the end of two hours, four hours and eighteen hours at room temperature. In all cases the lytic specificity thus deduced was confirmed by the modern technic of specific antibody absorption on washed corpuscles.[8]

Applying these two technics, Ferguson obtained nine different maternal isohemolysins, each reacting specifically or relatively specifically with the corresponding daughter erythrocytes. Seven of these isolysins were qualitatively distinct from one another, by means of which bovine erythrocytes could be divided into seven distinct monovalent groups (A, B, C, E, G, H, I). In addition to these seven basic groups there were numerous bivalent (e. g., GH, DF), trivalent (e. g. GHI) and polyvalent (e. g. ABCE, ACEG) blood groups, thus giving a total of eighteen relatively distinct blood groups in the local herds. Analyses of the paternal and maternal erythrocytic specificities of 104 offspring suggested that five of these blood groupings are inherited independently of one another, each presumably being the expression of a single hereditary gene. Two other specificities, however, are genetically related, being presumably expressions of allelomorphic genes.

Ferguson believes that future applications of the same two technics will lead to the identification of an even larger number of bovine blood groups, his predicted number being "equal to the total number of bovine chromosomes." Ferguson's work is of prophetic clinical interest, since it suggests a possible future multiplicity of recognized human blood groups as soon as the modern technic of immune isolysins is adopted in routine clinical laboratories. Such antigenic differentials have, of course, been suggested from a study of the serums of people who have undergone repeated transfusions with the blood of the same donor.[9]

Clinical interest in Ferguson's conclusions is further heightened by the recent discovery of a Macacus rhesus antigen (Rh) in many samples of human blood,[10]

1. Ferguson, L. C.: J. Immunol. **40:** 213 (Feb.) 1941.
2. Ottenberg, Reuben, and Friedman, S. S.: J. Exper. Med. **13:** 531, 1911.
3. Fishbein, Morris: J. Infect. Dis. **12:** 133, 1913.
4. Panisset, L., and Verge, L.: Compt. rend. Soc. de biol. **87:** 870, 1922.
5. Levine, P., and Mabee, J.: J. Immunol. **8:** 425 (Nov.) 1923.
6. Little, Ralph B.: J. Immunol. **17:** 377 (Nov.) 1929.
7. Lindemann, Edward: Blood Transfusion, J. A. M. A. **62:** 993 (March 28) 1914. Bowcock, H. M.: Bull. Johns Hopkins Hosp. **32:** 83 (March) 1921.
8. Krumweide, C.; Cooper, G., and Provost, D. J.: J. Immunol. **10:** 55 (Jan.) 1925.
9. Wiener, A. S.: Blood Groups and Blood Transfusion, ed. 2, Baltimore, Charles S. Thomas, 1939.
10. Landsteiner, K., and Wiener, A. S.: Proc. Soc. Exper. Biol. & Med. **43:** 233 (Jan.) 1940.

together with the rapidly accumulating evidence that isolysins against this paternal Rh factor may be the essential etiologic agents in many cases of eclampsia, repeated abortion, icterus gravis neonatorum and erythroblastosis fetalis.[11]

Current Comment

HEALTH EDUCATION IN THE Y. M. C. A.

The Young Men's Christian Association has long emphasized physical education; more recently it has extended its interest to include health education in the broader sense. A study [1] of health education procedures in four hundred Y. M. C. A.'s has just been conducted by MacGregor. Of the four hundred questionnaires sent out 58 per cent, or two hundred and thirty, were returned. In these questionnaires brief statements were presented as to principles, policies and activities in health education and physical training with provision for voting on each as to whether it was certainly desirable, probably desirable, doubtful, probably undesirable or certainly undesirable and with additional space for recording whether these policies and principles were fully in effect, partially in effect or not in effect at all. When the two hundred and thirty questionnaires had been tabulated, the results were submitted for appraisal to a jury of seven doctors of medicine, seven professors of education and seven Y. M. C. A. secretaries, all versed in health education. Out of these replies, plus the jury's evaluation of the tabulated replies, fifty established principles were enunciated. Of these the following seem of interest to the medical profession:

1. The scope of the health education program in the Y. M. C. A. should include the physical, mental, emotional and social aspects of health and their interrelationship, with special emphasis on the physical.

4. The Y. M. C. A. health education program should contribute to the improvement of community health through work with its members.

6. Health education in the Y. M. C. A. should be a year round program.

15. In general, the approach in health education should be positive, with emphasis on what to do rather than on what not to do.

16. It is fundamental in the health education program that constant recognition be given to individual differences.

19. The effectiveness of the health education program depends in large measure on the competence and training of the director in charge.

21. Incoming members of the Y. M. C. A. should be required to have a physical examination.

22. The physical examination should be made by a doctor of medicine, licensed in the state.

26. The results of the physical examination should be kept in strict confidence.

29. Objective tests of health and fitness should be made available in the physical department with a system of records whereby members may follow their improvement. The limitations of such tests should be recognized.

30. Scientific information should be made available to correct and combat health fads, superstitions, fears and malpractices.

41. The physical director in the Y. M. C. A. may administer tests of physical fitness.

42. The physical director in the Y. M. C. A. may render only first aid treatment in cases of athletic injury.

43. The physical director in the Y. M. C. A. may advise individuals of normal health (nonpathologic cases) regarding the most beneficial type and amount of exercise for conditioning, reducing, body building and correcting posture.

44. The physical director in the Y. M. C. A. may recommend to the individual in normal health (nonpathologic cases) general principles of diet already laid down in books written by doctors for laymen.

46. Orthopedic defects should be referred for diagnosis and treatment to fully and legally qualified practitioners.

47. Diagnosis and treatment of disease and prescription of internal medicine should rest entirely with the medical profession.

48. Discretion should be used in referring individuals to free service institutions.

49. There should be a definite policy for referring members of the Y. M. C. A., on request, to doctors or specialists.

50. This referral policy should have the approval of the local medical society.

This study, which will unquestionably influence the policies in physical training and health education of the Y. M. C. A.'s affairs, is of interest to the medical profession in that it paves the way for cooperation in local programs between the local Y. M. C. A. and the county medical societies.

DIET BY TAXATION

Hardly a person now alive remembers the time when federal taxes were levied alone for the simple purpose of raising revenue. It required no genius to discover that the power of taxation may be put to other uses. Although the Supreme Court of the United States in a memorable decision declared that the power to tax is the power to destroy, few citizens pay much attention to the implications of that statement. In our national life the levying of taxes is being increasingly used as an economic instrument. Taxation is becoming the favorite tool of economic pressure groups who desire to liquidate other pressure groups. The dairy interests, for example, have been conspicuous in their employment of taxation to suppress competing articles of food. Perhaps this example suggested the idea that people could be compelled by taxation to eat what is good for them. In a recent article "Fortification of Foodstuffs" [1] the proposal is made to compel the use of whole wheat bread by placing a tax on white bread and by offering a government subsidy for the manufacture of whole wheat bread. Perhaps some one will next propose the taxation of beef with a subsidy for the pork packers because pork is richer in vitamin B_1. The government could put a similar levy on grapefruit with a subsidy for orange juice because the latter contains a little more vitamin C. Producers of cane sugar might ask for taxation of corn sugar because cane sugar is sweeter, or sheep raisers might urge a tax on cotton goods because woolens are warmer. If it were not that the power of taxation has been so frequently and so outrageously employed, one could hardly take the latest proposal seriously.

11. Levine, Philip; Katzin, E. M., and Burnham, Lyman: Isoimmunization in Pregnancy, J. A. M. A. **116**: 825 (March 1) 1941.

1. A Normative Survey of Health Education in the Young Men's Christian Association, prepared by W. Gordon MacGregor, director of physical education, Central Y. M. C. A., Baltimore, mimeographed.

1. Luck, J. Murray: Fortification of Foodstuffs, Nutrition Conference, University of California, Berkeley, Calif., May 3, 1941; Science **94**: 31 (July 11) 1941.

MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

NATIONAL GUARD MEDICAL OFFICERS ON ACTIVE DUTY

Following is a list of the medical officers on duty with National Guard units of the various states which have been called into active service, together with the organization and camp at which they were serving when this report was recently submitted to these headquarters:

ALABAMA

BARNES, Rhett G., Captain, Birmingham, 104th Separate Battalion Coast Artillery (AA) Camp Stewart, Ga.
BROWN, Hunter M., Captain, Birmingham, 167th Inf., Camp Blanding.
FORD, Joseph W., Captain, Gadsden, 167th Inf., Camp Blanding, Fla.
GARY, Robert E., Captain, Tuscumbia, 151st Engineers.
HEADSTREAM, James W., Captain, Mobile, Special Troops, 31st Division, Camp Blanding, Fla.
JENKINS, John F., Jr., Capt., Birmingham, 167th Inf., Camp Blanding.
MAJORS, Webster Blakely, Major, Tuscaloosa, 167th Infantry, Camp Blanding, Fla.
NUNGESTER, Gerrold H., Captain, Decatur, 151st Engineers.
O'NEAL, Lester C., Major, Andalusia, 117th Fld. Art., Camp Blanding.
WINDHAM, Samuel W., Capt., Geneva, 117th Fld. Art., Camp Blanding.
WRIGHT, Duward O., Captain, Fort Payne, 167th Inf., Camp Blanding.

ARIZONA

KIRMSE, Alvin, Captain, Tucson, 158th Infantry, Fort Sill, Okla.
PERKINS, Frederick P., Major, Phoenix, 158th Infantry, Fort Sill, Okla.
PHILLIPS, Neal J., Captain, Oatman, 158th Infantry, Fort Sill, Okla.
YOUNT, Clarence E., Jr., Captain, Prescott, 158th Inf., Fort Sill, Okla.

ARKANSAS

ARCHER, Charles A., Jr., 1st Lieut., Hodge, La., 153d Infantry, Camp Joseph T. Robinson, Ark.
BREWER, Howell, Lieut. Colonel, Hot Springs National Park, 153d Infantry, Camp Joseph T. Robinson, Ark.
BRIZZOLARA, Charles M., 1st Lieut., Douglas, Ariz., 142d Field Artillery, Fort Sill, Okla.
BROOKE, Hugh C., Major, Conway, 153d Infantry, Camp Robinson, Ark.
GATES, Stanley M., Major, Monticello, 206th Coast Artillery (AA), Fort Bliss, Texas.
HENRY, Lewis M., Capt., Fort Smith, 142d Fld. Art., Fort Sill, Okla.
HYATT, Cyril L., 1st Lieut., Little Rock, 153d Infantry, Camp Robinson.
HYATT, Robert F., Jr., 1st Lieut., Hodge, La., 153d Infantry, Camp Joseph T. Robinson, Ark.
KELLY, Robert M., 1st Lieut., Sheridan, 206th Coast Artillery (AA), Fort Bliss, Texas.
MONROE, Sanford C., 1st Lieut., Nashville, Tenn., 153d Infantry, Camp Joseph T. Robinson, Ark.
RANEY, Thomas J., Jr., Captain, Little Rock, 206th Coast Artillery (AA), Fort Bliss, Texas.
RICHARDSON, Fount, Major, Fayetteville, 142d Fld. Artillery, Fort Sill.
SISCO, Friedman, Capt., Springdale, 142d Fld. Artillery, Fort Sill, Okla.

CALIFORNIA

BERMAN, Irving S., 1st Lieut., Los Angeles, 115th Medical Regiment, Camp San Luis Obispo, Calif.
CHRISTIAN, Sam G., Captain, Sacramento, 184th Infantry, Camp San Luis Obispo, Calif.
COLBURN, Justin R., Captain, Oakland, 143d Field Artillery, Camp San Luis Obispo, Calif.
COLBY, Elliott G., Major, San Diego, 251st Coast Artillery (AA), Camp Malakole, Oahu, Hawaii.
COLM, Cyrenus L., 1st Lieut., Durham, 115th Medical Regiment, Camp San Luis Obispo, Calif.
DAWSON, George I., Major, Napa, 184th Inf., Camp San Luis Obispo.
DEAN, James R., Lieut. Colonel, Los Angeles, 115th Medical Regiment, Camp San Luis Obispo, Calif.
GALBRAITH, Harold F., 1st Lieut., Ventura, 144th Field Artillery, Fort Lewis, Wash.
GHORMLEY, Verne G., Captain, Fresno, 185th Infantry, Camp San Luis Obispo, Calif.
GIDLEY, Donald S., Captain, Ontario, 185th Inf., Camp San Luis Obispo.
GRAESER, Henrik S., 1st Lieut., Woodland, 184th Infantry, Camp San Luis Obispo, Calif.
HANSEN, Robert M., 1st Lieut., Fresno, 185th Infantry, Camp San Luis Obispo, Calif.
HARDING, William F. B., Captain, Sacramento, 184th Infantry, Camp San Luis Obispo, Calif.
HELSLEY, Gordon F., Major, San Francisco, 250th Coast Artillery (TD), Camp McQuaide, Calif.
HESSER, Robert N., Captain, Los Angeles, 160th Infantry.
ISOARD, Max C., Major, Sacramento, 184th Infantry, Camp San Luis Obispo, Calif.
JENNEY, Evelynd Ross, Capt., Los Angeles, 115th Quartermaster Reg.
JONES, Glen E., Captain, Los Angeles, 160th Infantry.
KELSO, Raymond W., Captain, Long Beach, 251st Coast Artillery (AA), Camp Malakole, Oahu, Hawaii.
LAGEN, John B., Major, San Francisco, 159th Infantry, Camp San Luis Obispo, Calif.
LAUER, Marvin S., Captain, Compton, 115th Medical Regiment, Camp San Luis Obispo, Calif.
LOVELL, Robert A., Major, Alhambra, 160th Infantry.
LUPPI, Alfred P., 1st Lieut., Santa Barbara, 144th Fld. Art., Fort Lewis.
MacCALLUM, Daniel B., Colonel, Los Angeles, 115th Medical Regiment, Camp San Luis Obispo, Calif.
MIRANDA, Melvyn R., Captain, Long Beach, 115th Medical Regiment, Camp San Luis Obispo, Calif.
PEARCE, Carlyle M., Major, Oakland, 159th Inf., Camp San Luis Obispo, Calif.
PHILLIPS, Albert D., Major, Sacramento, 184th Infantry, Camp San Luis Obispo, Calif.
PREUSS, Charles August, Major, Santa Barbara, 144th Field Artillery, Fort Lewis, Wash.
RAND, Frederick S., Captain, Los Angeles, 115th Medical Regiment, Camp San Luis Obispo, Calif.
RITCHIE, Douglas W., Captain, Hondo, 115th Medical Regiment, Camp San Luis Obispo, Calif.
ROGERS, Maurice B., 1st Lieut., Los Angeles, 115th Quartermaster Regt.
ROHRBACHER, George H., Lieut. Colonel, Stockton, 115th Medical Regiment, Camp San Luis Obispo, Calif.
SCHUMACHER, Irwin C., Lieut. Colonel, San Francisco, 159th Infantry, Camp San Luis Obispo, Calif.
SMITH, Reynolds D., Major, Los Angeles, 115th Observation Squadron.
STILSON, Homer O., 1st Lieut., National City, 251st Coast Artillery (AA), Camp Malakole, Oahu, Hawaii.
STRYBLE, Francis J., 1st Lieut., Oakland, 159th Infantry, Camp San Luis Obispo, Calif.
SURACI, Rocco T., 1st Lieut., Oakland, Special Troops, 40th Division, Camp San Luis Obispo, Calif.
SYMAN, Leo W., 1st Lieut., Los Angeles, 115th Medical Regiment, Camp San Luis Obispo, Calif.
TABER, Kenneth W., Captain, Pasadena, 115th Medical Regiment, Camp San Luis Obispo, Calif.
THOMAS, Bert S., Lieut. Colonel, Sacramento, State Staff.
THOMPSON, Claude V., Major, Lodi, 143d Field Artillery, Camp San Luis Obispo, Calif.
VAN DEVENTER, William C., Captain, Aptos, 250th Coast Artillery (TD), Camp McQuaide, Calif.
WHITE, Marcus D., Major, Ontario, 115th Medical Regiment, Camp San Luis Obispo, Calif.

COLORADO

BARFIELD, James Jackson, Capt., Colorado Springs, 168th Fld. Art.
BRETHOUWER, Norman A., Captain, Montrose, 157th Infantry.
HARTSHORN, Duane F., Lieut. Colonel, Ft. Collins, 124th Med. Squad.
STANDER, Thomas R., Major, Denver, 168th Field Artillery.
TOWBIN, Samuel, Major, Denver, 157th Infantry.
TURNER, Carlos L., Capt., Denver, 120th Obser. Squadron, Fort Bliss.
WHITELEY, Philip W., Lieut. Colonel, Denver, State Staff.

CONNECTICUT

ABRASHKIN, Mortimer D., Captain, New Haven, 102d Infantry, Camp Blanding, Fla.
ANTELL, Maxwell J., Major, Bridgeport, 242d Coast Artillery, Ft. Terry.
ANTON, Michael C., 1st Lieut., New Haven, 242d Coast Artillery, Fort Terry, N. Y.
AWDZIEWICZ, Francis J., 1st Lieut., Stamford, 192d Field Artillery, Camp Blanding, Fla.
BOYARSKY, Harry M., Captain, Wallingford, 118th Medical Regiment, Camp Blanding, Fla.
CIMINERA, Joseph A., Lieut. Colonel, Waterbury, 102d Infantry, Camp Blanding, Fla.
COGLAND, John L., Captain, Hartford, 118th Observation Squadron.
COLE, Milton J., 1st Lieut., Hartford, 169th Inf., Camp Blanding, Fla.

COMFORT, Charles W., Jr., Colonel, New Haven, 118th Medical Regiment, Camp Blanding, Fla.
CRESSY, Norman L., 1st Lieut., Meriden, 169th Inf., Camp Blanding.
DE PASQUALE, Francis L., Major, Hartford, 208th Coast Artillery, Camp Edwards, Mass.
DE PASQUALE, John A., Captain, Hartford, 118th Medical Regiment, Camp Blanding, Fla.
DESMOND, Charles T., 1st Lieut., New York, N. Y., 208th Coast Artillery, Camp Edwards, Mass.
DISKAN, Albert E., 1st Lieut., Manchester, 169th Inf., Camp Blanding.
DUFFY, Leo T., Major, Hartford, 169th Infantry, Camp Blanding, Fla.
FINDORAK, Francis G., 1st Lieut., Stratford, 118th Medical Regiment, Camp Blanding, Fla.
FOSTER, Albert D., Jr., 1st Lieut., Hartford, 169th Inf., Camp Blanding.
FRIEDBERG, Isadore H., 1st Lieut., Brookline, Mass., 169th Infantry, Camp Blanding, Fla.
HABERLIN, Chester E., Major, Stratford, 118th Medical Regiment, Camp Blanding, Fla.
HEIDGER, Luther C., Capt., Stratford, 242d Coast Artillery, Fort Terry.
HERSEY, Thomas F., 1st Lieut., Boston, 192d Fld. Art., Camp Blanding.
KENNEDY, William C., Captain, Torrington, 102d Inf., Camp Blanding.
LANKIN, Joseph J., 1st Lieut., Hartford, 118th Medical Regiment, Camp Blanding, Fla.
LUDWIG, Edward W., Captain, Ansonia, 118th Medical Regiment, Camp Blanding, Fla.
MAYNARD, Harry H., Lieut. Colonel, New Haven, 118th Medical Regiment, Camp Blanding, Fla.
O'BRASKY, George H., Major, New Haven, 118th Medical Regiment, Camp Blanding, Fla.
ROY, Joseph L., Captain, North Grosvenor Dale, 208th Coast Artillery, Camp Edwards, Mass.
SAVAGE, Philip J., Major, New London, 192d Field Artillery, Camp Blanding, Fla.
SMITH, William B., Major, Wethersfield, State Staff.
SNURKOWSKI, Charles V., Major, New Haven, 118th Medical Regiment, Camp Blanding, Fla.
SQUILLANTE, Orlando J., 1st Lieut., Danbury, 118th Medical Regiment, Camp Blanding, Fla.
YABOVITZ, Myer, 1st Lieut., Danbury, 118th Medical Regiment, Camp Blanding, Fla.

DELAWARE

BECK, Joseph R., Captain, Dover, 198th Coast Artillery, Camp Edwards.
LAWRENCE, Charles T., Jr., Captain, Wilmington, 198th Coast Artillery, Camp Edwards, Mass.
MC DANIEL, Joseph S., Jr., 1st Lieut., Dover, 261st Coast Artillery, Fort Du Pont, Del.
WASHBURN, Victor D., Major, Wilmington, State Staff.

DISTRICT OF COLUMBIA

BUTLER, DeRuyter A., Captain, 372d Infantry.
GRAYSON, Stewart M., Major, 260th Coast Artillery, Fort Bliss, Texas.
HECKER, Robert C., Captain, 121st Engineers, Fort Meade, Md.
McKAIG, Malcolm C., Captain, 260th Coast Artillery, Fort Bliss, Texas.
MUSSO, Charles M., Jr., Capt., 104th Quartermaster Regt., Fort Meade.
NORCROSS, John A., 1st Lieut., 121st Engineers, Fort Meade, Md.
SUTTENFIELD, Frederick D., Major, 121st Engineers, Fort Meade, Md.
TAGGART, Samuel R., Major, 104th Quartermaster Regt., Fort Meade.
TIERNEY, Gerald M., Captain, 260th Coast Artillery, Fort Bliss, Texas.
TODD, Oswald V., Captain, Special Troops, 29th Division, Fort Meade.

FLORIDA

BOSWORTH, Joseph M., Jr., Captain, Lakeland, 116th Field Artillery.
GABLE, Nonie W., Major, St. Petersburg, 116th Field Artillery.
HARRELL, Henry L., Major, Ocala, 265th Coast Artillery, Fort Crockett.
HOPKINS, Clack D., Captain, Tampa, 116th Field Artillery.
MANSON, Alexander M., Captain, Jacksonville, 265th Coast Artillery, Fort Crockett, Texas.
MARTIN, Emmett E., Captain, Haines City, 106th Engineers.
SCOTT, Douglas G., Major, Sanford, 124th Inf., Camp Blanding, Fla.
SISLER, Bruce H., Major, Miami Beach, 106th Medical Regiment, Camp Blanding, Fla.
STAMPS, Walker, Captain, Jacksonville, 124th Inf., Camp Blanding, Fla.
YOUMANS, Corren P., Lieut. Colonel, Miami, 106th Medical Regiment, Camp Blanding, Fla.

GEORGIA

BARFIELD, William E., 1st Lieut., Atlanta, 179th Field Artillery, Camp Blanding, Fla.
BROOKS, Henry C., Jr., Captain, Augusta, 214th Coast Artillery.
BUTNER, John H., Captain, Atlanta, 105th Medical Regiment, Fort Jackson, S. C.
CAMPBELL, James L., Jr., Captain, Atlanta, 179th Field Artillery, Camp Blanding, Fla.
CARY, Howard R., Captain, Milledgeville, 214th Coast Artillery.
COCHRAN, George H., Major, Atlanta, 105th Medical Regiment, Fort Jackson, S. C.
ETHERIDGE, William N., 1st Lieut., Atlanta, 105th Medical Regiment, Fort Jackson, S. C.
HENDRY, William A., 1st Lieut., Blackshear, 101st Separate Battalion, Coast Artillery.
BAULDIN, John T., Captain, Atlanta, 179th Field Artillery, Camp Blanding, Fla.
McARTHUR, Charles E., Capt., Cordele, 121st Inf., Fort Jackson, S. C.
MOSLEY, Hugh G., Major, Atlanta, 179th Fld. Artil., Camp Blanding.
PATTON, Samuel E., Captain, Macon, 121st Infantry, Fort Jackson, S. C.
PIRKLE, James C., Captain, Milledgeville, 121st Inf., Fort Jackson, S. C.
REDMOND, Clarence R., 1st Lieut., Savannah, 118th Field Artillery.
ROBERTS, Burch J., Captain, Cornelia, Special Troops, 30th Division, Fort Jackson, S. C.
SCHAEFER, William B., Major, Toccoa, 214th Coast Artillery.

IDAHO

BECK, Wilford W., Jr., 1st Lieut., Blackfoot, 183d Field Artillery, Fort Francis E. Warren, Wyo.
HANCHER, William H., Captain, Weiser, 183d Field Artillery, Fort Francis E. Warren, Wyo.
ROTHMAN, Benjamin G., Captain, Grimes Pass, 116th Medical Regiment, Fort Lewis, Wash.
RULIEN, Ward A., Captain, Wendell, 116th Medical Regiment, Fort Lewis, Wash.
TALBOT, Robert E., Lieut. Colonel, Wilder, 183d Field Artillery, Fort Francis E. Warren, Wyo.
VAN DORN, Robert W., Major, Coeur d'Alene, 148th Field Artillery.

ILLINOIS

ALLEN, Robert A., Capt., Evanston, 122d Fld. Artillery, Camp Forrest.
ASH, Alfred S., Captain, Quincy, 130th Infantry, Camp Forrest, Tenn.
BAKER, Eugene L., Major, Chicago, 108th Med. Regt., Camp Forrest.
BAY, Anthony, Captain, Chicago, 108th Med. Regt., Camp Forrest, Tenn.
BEDESSEM, Philip M., Lieut. Colonel, Hines, 108th Medical Regiment, Camp Forrest, Tenn.
BELMONTE, John V., Captain, Chicago, 132d Inf., Camp Forrest, Tenn.
CECALA, Philip J., 1st Lieut., Chicago, 132d Inf., Camp Forrest, Tenn.
CHWATAL, Herbert F., Capt., Chicago, 108th Med. Regt., Camp Forrest.
CILELLA, Salvatore G., 1st Lieut., Chicago, 132d Inf., Camp Forrest.
COMER, Fay S., Captain, Cairo, 130th Infantry, Camp Forrest, Tenn.
COMESS, Oscar H., Captain, Chicago, 131st Infantry, Camp Forrest.
COOK, Mario V., 1st Lieut., Chicago, 132d Infantry, Camp Forrest.
CRANDLE, Ellis R., Captain, Carbondale, 130th Infantry, Camp Forrest.
CUMMING, Thomas S., 1st Lieut., Elgin, 108th Medical Regiment, Camp Forrest, Tenn.
DAVIS, Landis Y., Captain, Baylis, 130th Infantry, Camp Forrest, Tenn.
DAY, Ernest C., Capt., Chicago, 108th Med. Regt., Camp Forrest, Tenn.
DOLPH, Ivar E., Captain, Manito, 130th Infantry, Camp Forrest, Tenn.
EASTON, James W., Captain, Chicago, 108th Engineers, Camp Forrest.
EHRLICH, Maximilian C., Lieut. Colonel, Chicago, 124th Field Artillery, Camp Forrest, Tenn.
ENTIN, Samson D., 1st Lieut., Chicago, 108th Med. Regt., Camp Forrest.
FALLER, Adolph, Jr., Captain, Chicago, 124th Fld. Artil., Camp Forrest.
FELICELLI, Nello M., Captain, Chicago, Special Troops, 33d Division, Camp Forrest, Tenn.
FRISCH, Isaac J., Lieut. Colonel, Chicago, 108th Engineers, Camp Forrest, Tenn.
GIGANTI, James J., 1st Lieut., Chicago, Special Troops, 33d Division, Camp Forrest, Tenn.
GOLDSTENE, James K., Captain, Chicago, 108th Medical Regiment, Camp Forrest, Tenn.
GROTH, Norton R., 1st Lieut., Chicago, 108th Med. Regt., Camp Forrest.
GUERIN, John W., Captain, Cicero, 124th Field Artillery, Camp Forrest.
HOFFSTADT, John P., Lieut. Colonel, Chicago, 131st Infantry, Camp Forrest, Tenn.
HOLLADAY, William T., Captain, Amboy, 129th Inf., Camp Forrest.
HUNT, Robert E., Capt., Springfield, 106th Cav., Camp Livingston, La.
JOHNSON, Lester S., Major, Chicago, 122d Fld. Artillery, Camp Forrest.
KOCOUR, Elmer J., Captain, Chicago, 132d Infantry, Camp Forrest.
KOENIG, Frank J., Captain, Normal, 108th Quartermaster Regiment, Camp Forrest, Tenn.
LAGERQUIST, Howard D., Captain, Chicago, 108th Obser. Squadron.
MACNAMARA, Homer P., Major, Springfield, 106th Cavalry, Camp Livingston, La.
MAILER, Andrew R., Major, Galesburg, 123d Fld. Artil., Camp Forrest.
MAYES, Corwin S., Major, Springfield, State Staff.
MC KINLEY, James J., Colonel, Oak Park, 108th Medical Regiment, Camp Forrest, Tenn.
MC NAMARA, Edward W., 1st Lieut., Chicago, 108th Medical Regiment, Camp Forrest, Tenn.
MERCER, Ray, Lieut. Colonel, Quincy, 130th Infantry, Camp Forrest.
MINDLIN, Joseph, 1st Lieut., Chicago, 108th Med. Regt., Camp Forrest.
MOHR, Walter C., Major, Chicago, 108th Med. Regt., Camp Forrest.
MOLENGRAFT, Cornelius J., Captain, Chicago, 108th Medical Regiment, Camp Forrest, Tenn.
MULLEN, Timothy F., Major, Seneca, 129th Inf., Camp Forrest, Tenn.
PARKER, Harry J., 1st Lieut., Chicago, 108th Med. Regt., Camp Forrest.
POST, John, Captain, Chicago, 202d Coast Artillery.
PRITIKIN, Roland I., Major, Chicago, 108th Quartermaster Regiment, Camp Forrest, Tenn.
PREMPAS, Thomas G., Major, Chicago, 131st Infantry, Camp Forrest.
QUEEN, Frank B., Major, Chicago, 108th Med. Regt., Camp Forrest.
SMITH, Durand, Captain, Chicago, 108th Med. Regt., Camp Forrest.
SOROSKY, Solly, 1st Lieut., Chicago, 131st Infantry, Camp Forrest.
STETTAUER, Joseph L., Lieut. Colonel, Chicago, 108th Medical Regiment, Camp Forrest, Tenn.
SWEENEY, Anthony J., 1st Lieut., Chicago, 108th Medical Regiment, Camp Forrest, Tenn.
SWEITZER, Caesar J., 1st Lieut., Chicago, 108th Medical Regiment, Camp Forrest, Tenn.
TAMBONE, John R., 1st Lieut., Chicago, 108th Medical Regiment, Camp Forrest, Tenn.
VOLLER, Richard L., 1st Lieut., Cicero, 132d Infantry, Camp Forrest.
WAUD, Sydney P., Capt., Chicago, 106th Cavalry, Camp Livingston, La.
WHITFIELD, Harvey J., Captain, Chicago, 124th Field Artillery, Camp Forrest, Tenn.
ZEE, Maurice L., 1st Lieut., Chicago, 122d Field Artillery, Camp Forrest.

INDIANA

BLOOM, Asa W., Captain, Marion, 150th Field Artillery, Camp Shelby, Miss.
BROWN, Robert M., Captain, Marion, 113th Medical Regiment, Camp Shelby, Miss.
CARREL, Francis E., 1st Lieut., Indianapolis, 151st Infantry, Camp Shelby, Miss.
COMSTOCK, Glenn E., Major, Gary, 113th Engineers.
GLOCK, Maurice E., Major, Fort Wayne, 152d Infantry, Camp Shelby.
GREIST, John H., Major, Indianapolis, 113th Med. Regt., Camp Shelby.
HALLAM, Franklin T., Colonel, Indianapolis, 113th Medical Regiment, Camp Shelby, Miss.
HART, Lenpha P., Captain, Evansville, 113th Med. Regt., Camp Shelby.
HOWELL, Robert D., Major, Indianapolis, 113th Medical Regiment, Camp Shelby, Miss.
JOBES, James E., Captain, Indianapolis, 113th Medical Regiment, Camp Shelby, Miss.
KEELING, Forrest E., Major, Portland, 139th Field Artillery, Camp Shelby, Miss.
LANSFORD, John, Capt., Red Key, 139th Field Artillery, Camp Shelby.
LEE, Glen W., Captain, Richmond, State Staff, Indianapolis.
MANLEY, Charles N., Captain, Rising Sun, 151st Inf., Camp Shelby.
MARSHALL, Albert L., Jr., Captain, Indianapolis, 151st Infantry, Camp Shelby, Miss.
MUELLER, Donald F., 1st Lieut., Fort Wayne, 152d Infantry, Camp Shelby, Miss.
MULLEN, Joseph J., 1st Lieut., Fort Wayne, 152d Inf., Camp Shelby.
OYER, John H., Captain, Fort Wayne, 152d Infantry, Camp Shelby.
PEELER, Malcolm O., 1st Lieut., Fort Wayne, 152d Inf., Camp Shelby.
PFAFF, Dudley A., Captain, Indianapolis, 113th Observation Squadron.
RAMSEY, Frank B., Major, Indianapolis, 113th Medical Regiment, Camp Shelby, Miss.
RITCHEY, John A., Capt., Marion, 150th Field Artillery, Camp Shelby.
SCOTT, Ivan W., 1st Lieut., Indianapolis, 151st Infantry, Camp Shelby.
SLUSS, David H., Lieut. Colonel, Indianapolis, 113th Medical Regiment, Camp Shelby, Miss.
WARFEL, Frederick C., Major, Indianapolis, 151st Inf., Camp Shelby.
WASHBURN, Richard N., Captain, Rensselaer, 113th Medical Regiment, Camp Shelby, Miss.

IOWA

ANDERSON, Nevin B., Lieut. Colonel, Des Moines, 113th Cavalry, Camp Bowie, Texas.
ANSPACH, Royal S., Major, Mitchellville, 136th Medical Regiment, Camp Claiborne, La.
BAKER, Charles J., Captain, Fort Dodge, 136th Medical Regiment, Camp Claiborne, La.
BEAUMONT, Fred H., Major, Council Bluffs, 136th Med. Regt., Camp Claiborne, La.
BRINKHOUS, Kenneth M., Captain, Iowa City, 136th Medical Regiment, Camp Claiborne, La.
BURDICK, Francis D., 1st Lieut., Shenandoah, 168th Infantry, Camp Claiborne, La.
BURGESON, Floyd M., Captain, Des Moines, 168th Infantry, Camp Claiborne, La.
BUSH, Earl B., Colonel, Ames, 136th Med. Regt., Camp Claiborne, La.
CASTELL, John W., Captain, Fairfield, 133d Infantry, Camp Claiborne.
CONNELL, John R., Jr., Captain, Des Moines, 136th Medical Regiment, Camp Claiborne, La.
CONNER, John D., 1st Lieut., Nevada, 136th Medical Regiment, Camp Claiborne, La.
CORCORAN, Thomas E., 1st Lieut., Rock Rapids, 136th Medical Regiment, Camp Claiborne, La.
DAHL, Harry W., Lieut. Colonel, Des Moines, 168th Infantry, Camp Claiborne, La.
DETERS, Donald C., Capt., Schaller, 136th Med. Regt., Camp Claiborne.
ERVIN, Lindsay J., 1st Lieut., Baltimore, Md., 113th Cav., Camp Bowie.
FOURT, Arthur S., Lieut. Colonel, Iowa City, 136th Medical Regiment, Camp Claiborne, La.
GITTLER, Ludwig, Major, Fairfield, 133d Infantry, Camp Claiborne, La.
HARDIN, Robert C., Captain, Iowa City, 136th Medical Regiment, Camp Claiborne, La.
HEALY, Maurice J., Capt., Boone, 185th Fld. Artillery, Camp Claiborne.
HOWAR, Bruce F., 1st Lieut., Jewell, 136th Med. Regt., Camp Claiborne.
JACOBS, Carl A., 1st Lieut., Iowa City, 136th Medical Regiment, Camp Claiborne, La.
JENKINS, George D., Major, Burlington, 136th Medical Regiment, Camp Claiborne, La.
JIRSA, Harold O., Captain, Cedar Rapids, 136th Medical Regiment, Camp Claiborne, La.
KEITH, John J., Captain, Marion, 136th Med. Regt., Camp Claiborne.
KUNTZ, George S., Captain, Sibley, 136th Med. Regt., Camp Claiborne.
LOCHER, Robert C., Captain, Cedar Rapids, 136th Medical Regiment, Camp Claiborne, La.
LUDWICK, Arthur Lee, Jr., 1st Lieut., Waterloo, 133d Infantry, Camp Claiborne, La.
MARTIN, Lowell E., 1st Lieut., Des Moines, 113th Cav., Camp Bowie.
MERKEL, Byron M., Captain, Des Moines, State Staff.
MEYERS, Henry A., Major, Davenport, 185th Field Artillery, Camp Claiborne, La.
MINKEL, Roger M., Captain, Newton, 136th Medical Regiment, Camp Claiborne, La.
PARKE, John, Captain, Oakdale, La., 136th Medical Regiment, Camp Claiborne, La.
PAULUS, Edward W., Major, Iowa City, 136th Medical Regiment, Camp Claiborne, La.
PETERSEN, Vernon W., Major, Iowa City, 136th Medical Regiment, Camp Claiborne, La.
PRATT, Elmer B., 1st Lieut., Des Moines, 168th Infantry, Camp Claiborne, La.
PRENTISS, Robert J., Captain, Iowa City, 136th Medical Regiment, Camp Claiborne, La.
REDMOND, James J., Captain, Cedar Rapids, 136th Medical Regiment, Camp Claiborne, La.
SAAR, Jesse L., Jr., 1st Lieut., Iowa City, 136th Medical Regiment.
SANDERS, Matthew G., Captain, Fort Dodge, 136th Medical Regiment, Camp Claiborne, La.
SEDLACEK, Leo B., Captain, Cedar Rapids, 136th Medical Regiment, Camp Claiborne, La.
SENFELD, Sidney, 1st Lieut., Belle Plaine, 185th Field Artillery, Camp Claiborne, La.
SHEPHERD, Loyd K., 1st Lieut., Oakville, 136th Medical Regiment, Camp Claiborne, La.
SMITH, Rupard G., 1st Lieut., Cedar Falls, 133d Inf., Camp Claiborne.
TINLEY, Robert E., Captain, Council Bluffs, Special Troops, 34th Division, Camp Claiborne, La.
WOODHOUSE, Keith W., Captain, Cedar Falls, 136th Medical Regiment, Camp Claiborne, La.
WURL, Otto A., 1st Lieut., Council Bluffs, Special Troops, 34th Division, Camp Claiborne, La.
YETTER, William L., 1st Lieut., Iowa City, 136th Medical Regiment, Camp Claiborne, La.

KANSAS

ANDERSON, Arthur S., Major, Lawrence, 127th Field Artillery, Camp Joseph T. Robinson, Ark.
EPP, Frederic O., 1st Lieut., Larned, 137th Inf., Camp Robinson, Ark.
GLEASON, Kenneth J., Captain, Newton, 127th Field Artillery, Camp Joseph T. Robinson, Ark.
GLOYNE, Louis B., Major, Kansas City, 161st Field Artillery, Camp Joseph T. Robinson, Ark.
HAMMEL, Seth A., Lieut. Colonel, Topeka, State Staff.
KNAPP, Leslie E., Captain, Wichita, 157th Infantry.
LAWRENCE, Edward K., Major, Hiawatha, 130th Field Artillery, Camp Joseph T. Robinson, Ark.
MOTT, James M., Capt., Lawrence, 127th Fld. Artillery, Camp Robinson.
PINSKER, Jacob A., Captain, Hutchinson, 130th Field Artillery, Camp Joseph T. Robinson, Ark.
ROSS, Earl B., Major, San Antonio, Tex., 137th Inf., Camp Robinson.
WALTERS, Byron W., 1st Lieut., Lawrence, 127th Field Artillery, Camp Joseph T. Robinson, Ark.

KENTUCKY

ALBRITTON, James E., 1st Lieut., Paducah, 106th Separate Battalion, Coast Artillery (AA).
BILLINGTON, Charles B., Captain, Richmond, 113th Medical Regiment, Camp Shelby, Miss.
BIZOT, Byron, Captain, Louisville, 138th Field Artillery, Camp Shelby.
BLANTON, Harvey C., Captain, Richmond, 113th Medical Regiment, Camp Shelby, Miss.
CHOATE, Benjamin D., Lieut. Colonel, Louisville, 138th Field Artillery,
DEDDENS, Lloyd E., Capt., Louisville, 138th Fld. Artil., Camp Shelby.
HAYNES, Philip E., Major, Hopkinsville, 123d Cavalry.
LAMB, William F., Captain, Russellville, 149th Infantry.
MERENBLOOM, Derbert S., 1st Lieut., Corbin, 113th Quarter. Regt.
PIPES, James L., 1st Lieut., Mackville, 113th Med. Regt., Camp Shelby.
RIGGS, Robert C., Captain, Lexington, 123d Cavalry.
ROBBINS, Ballard F., Captain, Berea, 113th Med. Regt., Camp Shelby.
RUTLEDGE, Harold H., Captain, Williamsburg, 113th Medical Regiment, Camp Shelby, Miss.
WALKER, Jehu C., 1st Lieut., Packard, 149th Infantry.
WELLS, George M., Major, Bowling Green, 149th Infantry.

LOUISIANA

BISHOP, Clarence A., Captain, New Orleans, 106th Medical Regiment, Camp Blanding, Fla.
CHAUVIN, Eustace V., Jr., 1st Lieut., Lafayette, 156th Infantry, Camp Blanding, Fla.
CRAWFORD, Walter J., 1st Lieut., New Orleans, 141st Field Artillery, Camp Shelby, Miss.
DOUGHERTY, Cary M., 1st Lieut., New Orleans, 106th Medical Regiment, Camp Blanding, Fla.
FRESH, Chester S., Major, New Orleans, 106th Medical Regiment, Camp Blanding, Fla.
GARBER, Jared Y., Captain, Lake Charles, 156th Inf., Camp Blanding.
GORMAN, Cornelius E., Major, New Orleans, 106th Medical Regiment, Camp Blanding, Fla.
GRAY, Courtland J., Jr., Major, Monroe, 204th Coast Artillery, Camp Hulen, Texas.
HERBERT, Thomas E., 1st Lieut., New Orleans, 106th Medical Regiment, Camp Blanding, Fla.
HOWLE, Myron G., 1st Lieut., New Orleans, 141st Field Artillery, Camp Shelby, Miss.
KRAMER, Elmer E. W., 1st Lieut., New Orleans, 106th Medical Regiment, Camp Blanding, Fla.
LAMBERT, Lamar L., 1st Lieut., New Orleans, 106th Medical Regiment, Camp Blanding, Fla.
LA NASA, James J., 1st Lieut., New Orleans, 106th Medical Regiment, Camp Blanding, Fla.
LE DOUX, Marion J., 1st Lieut., New Orleans, 106th Medical Regiment, Camp Blanding, Fla.
LUCAS, Richard A., 1st Lieut., New Orleans, 122d Obser. Squadron.
MC CABE, James S., 1st Lieut., New Orleans, 106th Medical Regiment, Camp Blanding, Fla.
MILAM, DeWitt, T., Major, Monroe, 156th Infantry, Camp Blanding.
MOGABGAB, Anees, Colonel, New Orleans, 106th Medical Regiment, Camp Blanding, Fla.

PARRINO, Paul S., Major, Franklin, 141st Field Artillery, Camp Shelby.
RAND, Paul King, Jr., 1st Lieut., New Orleans, 156th Infantry, Camp Blanding, Fla.
ROGERS, Gordon K., Captain, New Orleans, 105th Separate Battalion, Coast Artillery, Camp Hulen, Texas.
ROMEO, Zachary J., Captain, New Orleans, 106th Medical Regiment, Camp Blanding, Fla.
SCOTT, Wood H., 1st Lieut., Bonita, 204th Coast Artillery, Camp Hulen.
TURK, William B., 1st Lieut., New Orleans, 106th Medical Regiment, Camp Blanding, Fla.
VAUDRY, James W., Captain, New Orleans, 106th Medical Regiment, Camp Blanding, Fla.
WHITE, James A., Jr., Captain, Alexandria, 156th Inf., Camp Blanding.
WHITTINGTON, Robert D., Jr., Captain, Bossier, 204th Coast Artillery, Camp Hulen, Texas.

MAINE

ASALI, Louis A., Capt., Portland, 240th Coast Artil., Fort Williams, Me.
BEEAKER, Vincent H., 1st Lieut., Lewiston, 103d Inf., Camp Blanding.
CASEY, William L., Major, Portland, 103d Inf., Camp Blanding, Fla.
CUTLER, Lawrence M., Captain, Bangor, 152d Field Artillery.
DUNHAM, Carl E., Captain, Portland, 103d Inf., Camp Blanding, Fla.
FOGG, Charles E., Major, Portland, 240th Coast Artillery, Fort Williams, Me.
FORD, Leonard H., Lieut. Colonel, Bangor, 152d Field Artillery.
GETCHELL, Ralph A., Captain, Portland, 240th Coast Artillery, Fort Williams, Me.
GUMPRECHT, Walter R., Major, Bangor, 103d Inf., Camp Blanding.
PRESSEY, Harold E., Major, Bangor, 152d Field Artillery.
TOWNE, Charles E., Captain, Waterville, 103d Infantry, Camp Blanding.
TOWNE, John G., Lieut. Colonel, Waterville, State Staff.

MARYLAND

AUBREY, John F., Captain, Baltimore, 104th Med. Regt., Fort Meade.
BEACHAM, Edmund G., 1st Lieut., Baltimore, 175th Inf., Fort Meade.
BUETTNER, Henry F., Major, Baltimore, 104th Med. Regt., Fort Meade.
BURGER, Thomas T., Capt., Baltimore, 110th Fld. Artillery, Fort Meade.
COOPER, Donald D., Captain, Towson, 104th Med. Regt., Fort Meade.
ELEDER, Franklin C., Major, Baltimore, 104th Med. Regt., Fort Meade.
FRANKLIN, Joseph P., Major, Cumberland, 115th Infantry.
GLASSMAN, Edward L., 1st Lieut., Baltimore, 175th Inf., Fort Meade.
HUTCHINS, Thomas M., 1st Lieut., Baltimore, 104th Medical Regiment, Fort George G. Meade, Md.
KIMBERLY, Robert C., Captain, Catonsville, 104th Medical Regiment,
KOONTZ, Amos R., Lieut. Colonel, Baltimore, State Staff.
KUNKOWSKI, Mitchell F., 1st Lieut., Baltimore, 104th Medical Regiment, Fort George G. Meade, Md.
MARTIN, Clarence W., II, 1st Lieut., Baltimore, 175th Inf., Fort Meade.
NUTTALL, James B., Captain, Baltimore, 104th Med. Regt., Fort Meade.
SABATINO, Bernard J., 1st Lieut., Baltimore, 104th Medical Regiment, Fort George G. Meade, Md.
SHELLEY, Harry S., Major, Baltimore, 175th Infantry, Fort Meade.
SINTON, William A., Major, Baltimore, 110th Fld. Artil., Fort Meade.
STURGIS, William J., Jr., Captain, Baltimore, 110th Field Artillery, Fort George G. Meade, Md.
THOMAS, Ramsay B., Captain, Baltimore, 104th Observation Squadron.
TRIPLETT, William H., Lieut. Colonel, Baltimore, 104th Medical Regiment, Fort George G. Meade, Md.
URLOCK, John P., Jr., 1st Lieut., Baltimore, 104th Medical Regiment, Fort George G. Meade, Md.
WANNER, Jesse R., Jr., 1st Lieut., Baltimore, 175th Inf., Fort Meade.
WILSON, Harry T., Jr., 1st Lieut., Baltimore, 175th Inf., Fort Meade.

MASSACHUSETTS

ABODEELY, Robert A., 1st Lieut., Worcester, 181st Infantry, Camp Edwards, Mass.
ABRIEL, Albert G., 1st Lieut., Boston, 180th Field Artillery.
BAER, Victor, Major, Boston, 101st Engineers.
BAILEY, Karl R., Colonel, Boston, 101st Med. Regt., Camp Edwards.
BAIN, David J., 1st Lieut., Lawrence, 101st Med. Regt., Camp Edwards.
BANQUER, Jacob E., Major, Boston, 241st Coast Artillery, Fort Andrews, Mass.
BARRY, John M., 1st Lieut., Lawrence, 101st Medical Regiment, Camp Edwards, Mass.
BEREZIN, Martin A., Capt., Medfield, 101st Med. Regt., Camp Edwards.
BOZIGIAN, Haig, 1st Lieut., Somerville, 101st Engineers.
CASEY, Daniel F., Jr., 1st Lieut., Webster, 181st Inf., Camp Edwards.
CHERNOFF, Arthur H., 1st Lieut., Saugus, 182d Infantry.
COLLINS, James F., 1st Lieut., Gloucester, 101st Medical Regiment, Camp Edwards, Mass.
CRUFF, Frederick E., Captain, Boston, 101st Observation Squadron.
CURRIER, Donald E., Major, Cambridge, State Staff.
de MARCO, Joseph, Jr., Captain, Worcester, 101st Medical Regiment, Camp Edwards, Mass.
DENNEN, Ralph Waite, Major, Waltham, 182d Infantry.
FISH, James E., Major, Boston, 101st Medical Regiment, Camp Edwards.
FLASCHNER, Ira, 1st Lieut., Boston, 101st Infantry, Camp Edwards.
FRIEND, Dale G., Captain, Boston, 101st Med. Regt., Camp Edwards.
GOODWIN, Paul, Major, Medford, 180th Field Artillery.
GURJIAN, Leon K., Captain, Lynn, 182d Infantry.
HARRINGTON, Philip V., 1st Lieut., Worcester, 181st Infantry, Camp Edwards, Mass.
HURLEY, Daniel J., Lieut. Colonel, Boston, 101st Medical Regiment, Camp Edwards, Mass.
HYATT, Gilbert T., Captain, Fall River, 241st Coast Artillery, Fort Andrews, Mass.
KEENAN, James A., Major, Boston, 101st Infantry, Camp Edwards.
LE BEAUX, Lincoln, 1st Lieut., Worcester, 181st Inf., Camp Edwards.
MAC KILLOP, John A., 1st Lieut., Cambridge, 102d Field Artillery.
MARTINSON, Melvin S., 1st Lieut., Worcester, 101st Medical Regiment, Camp Edwards, Mass.
MC KOAN, John W., Jr., Major, Worcester, 181st Inf., Camp Edwards.
MC LEOD, Melvin S., Captain, Boston, 241st Coast Artillery, Fort Andrews, Mass.
McQUADE, Lewis S., Major, Boston, 102d Field Artillery.
MONROE, Noel G., Major, Newton, 101st Field Artillery.
MORRISON, Norman B., Major, Brookline, 101st Quatermaster Regt.
PEAL, Stanley, 1st Lieut., Worcester, 101st Med. Regt., Camp Edwards.
REARDON, Edward R., 1st Lieut., Boston, 101st Medical Regiment, Camp Edwards, Mass.
REID, Howard S., Major, Cohasset, 101st Med. Regt., Camp Edwards.
RONKA, Ensio K., Major, Quincy, 101st Med. Regt., Camp Edwards.
SALMON, Charles A., Major, Worcester, 101st Medical Regiment, Camp Edwards, Mass.
STALK, Theodore, 1st Lieut., Egypt, 101st Med. Regt., Camp Edwards.
SWEETSER, Peter W., 1st Lieut., Caribou, Me., 104th Infantry, Camp Edwards, Mass.
THOMAS, Edwin B., 1st Lieut., Cataumet, 101st Medical Regiment, Camp Edwards, Mass.
VERNON, Hollis E., 1st Lieut., Webster, 181st Inf., Camp Edwards.
VROOMAN, Earle M., Major, North Adams, 104th Inf., Camp Edwards.
WALSH, Francis X., 1st Lieut., Boston, Special Troops, 36th Division.
WHELAN, Edmund L., 1st Lieut., Malden, 182d Infantry.
WOLK, Eliot, Captain, Boston, 101st Med. Regt., Camp Edwards, Mass.
YENS, Otto C., Captain, Cambridge, 102d Field Artillery.

MICHIGAN

ADAMS, Ralph W., 1st Lieut., Detroit, 182d Field Artillery, Fort Wood.
BIERY, Martin L., 1st Lieut., Detroit, 107th Medical Regiment, Camp Beauregard, La.
BOET, John T., Captain, Grand Rapids, 126th Inf., Camp Beauregard.
BRANCHEAU, Lynus T., 1st Lieut., New Boston, Special Troops, 32d Division, Camp Beauregard, La.
BROWN, Marion G., 1st Lieut., Detroit, 182d Field Artillery, Fort Wood.
BUCK, John D., Colonel, Detroit, 107th Med. Regt., Camp Beauregard.
BURT, Charles W., Capt., Detroit, 107th Med. Regt., Camp Beauregard.
CARPENTER, William S., Captain, Detroit, 182d Field Artillery, Fort Leonard Wood, Mo.
CLARKE, Niles A., Captain, New Boston, 107th Medical Regiment, Camp Beauregard, La.
DAVIS, Lindon L., Captain, Detroit, 210th Coast Artillery.
DAVIS, William I., 1st Lieut., Detroit, 182d Field Artillery, Fort Wood.
DE MEULENAERE, John C., 1st Lieut., Detroit, 107th Medical Regiment, Camp Beauregard, La.
FRANTZ, Charles H., Major, Grand Rapids, 126th Infantry, Camp Beauregard, La.
FURLONG, Harold A., Lieut. Colonel, Pontiac, State Staff.
HANNA, Carl, Lieut. Colonel, Detroit, 107th Medical Regiment, Camp Beauregard, La.
LADD, Graham B., 1st Lieut., Detroit, 107th Engin., Camp Beauregard.
LAMMY, James V., Major, Detroit, 107th Med. Regt., Camp Beauregard.
LEPISTO, Victor Elias, Jr., 1st Lieut., Detroit, 177th Field Artillery.
MARSH, Roland G., Major, Tecumseh, 107th Medical Regiment, Camp Beauregard, La.
MC COLL, Charles W., 1st Lieut., Wyandotte, 107th Medical Regiment, Camp Beauregard, La.
MILLER, Kenneth T., Captain, Detroit, 177th Field Artillery.
NIGG, Herbert L., 1st Lieut., Detroit, 177th Field Artillery.
PATTERSON, Robert A., 1st Lieut., Detroit, 107th Medical Regiment, Camp Beauregard, La.
PRATT, Lawrence A., Captain, Detroit, 210th Coast Artillery.
REID, John G., 1st Lieut., Detroit, 107th Engineers, Camp Beauregard.
SHAW, Milton, Lieut. Colonel, Lansing, State Staff.
SMITH, William S., 1st Lieut., Detroit, 177th Field Artillery.
SOLLER, Matthew E., Major, Ypsilanti, 107th Medical Regiment, Camp Beauregard, La.
TARTER, Clyde S., Major, Bay City, 107th Medical Regiment, Camp Beauregard, La.
VAIL, Harry F., 1st Lieut., Unionville, 107th Medical Regiment, Camp Beauregard, La.
VANDER ZALM, Theodore P., Major, Lansing, 119th Field Artillery.
WALLACE, Herbert C., Captain, Saginaw, 107th Medical Regiment, Camp Beauregard, La.
WARMENHOVEN, Simon, Captain, Grand Rapids, 126th Infantry, Camp Beauregard, La.
WELLARD, Henry C., Captain, New Baltimore, 125th Infantry, Camp Beauregard, La.
WILLSON, Wesley W., Major, Detroit, 210th Coast Artillery.
WURZ, John F., 1st Lieut., Grand Rapids, Mich., 107th Medical Regiment, Camp Beauregard, La.

MINNESOTA

ANDREASSEN, Einar C., Major, Minneapolis, 135th Infantry (R), Camp Claiborne, La.
CEPLECHA, Stanley F., Captain, Redwood Falls, 215th Coast Artillery (AA), Camp Haan, Calif.
CREIGHTON, Ralph H., Captain, Minneapolis, 135th Infantry (R), Camp Claiborne, La.
EKLUND, William J., Major, Duluth, 125th Fld. Artil., Camp Claiborne.
HAMLON, John S., Capt., St. Charles, 135th Inf. (R), Camp Claiborne.
HULLSIEK, Richard B., Lieut. Colonel, St. Paul, MD State Staff.
JACOBSON, Wyman E., Captain, Minneapolis, 135th Infantry (R), Camp Claiborne, La.
JOHNSON, Vilhelm M., Capt., Dawson, 135th Inf. (R), Camp Claiborne.
JOHNSON, Youbert T., Major, Minneapolis, 109th Obsn. Squadron.
JONES, Herbert W., Jr., Captain, Minneapolis, 151st Field Artillery, Camp Claiborne, La.
KARN, Jacob F., Captain, St. Paul, 138th Infantry.

LEITSCHUH, Linus F., 1st Lieut., Red Lake Falls, 217th Coast Artillery (AA).
LYON, John D., Jr., Captain, Minneapolis, 151st Field Artillery, Camp Claiborne, La.
SAMUELSON, Leopold G., Major, Mankato, 218th Coast Artillery (AA).
SCHMIDT, George F., Lieut. Colonel, Minneapolis, 151st Field Artillery, Camp Claiborne, La.
STRATTE, Alf K., Captain, Pine City, 125th Field Artillery, Camp Claiborne, La.
URBERG, Sofus E., Capt., Duluth, 125th Fld. Artillery, Camp Claiborne.
WILLIAMSON, George A., Major, St. Paul, 216th Coast Artillery (AA), Camp Haan, Calif.
WOLFE, Howard H., Captain, St. Paul, 216th Coast Artillery (AA), Camp Haan, Calif.

MISSISSIPPI

ARMSTRONG, James H., Captain, Oxford, 106th Quartermaster Regiment, Camp Blanding, Fla.
BAINES, Thomas A., Captain, Jackson, 106th Medical Regiment.
BOLTON, Eldon L., Capt., Biloxi, 114th Field Artillery, Camp Blanding.
BUSH, Eugene A., Captain, Laurel, 106th Med. Regt., Camp Blanding.
DORRIS, Henry C., Captain, Winona, 155th Infantry, Camp Blanding.
EUBANKS, George W., Major, Greenville, 114th Field Artillery, Camp Blanding, Fla.
FOX, James H., Major, Jackson, 106th Engineers.
HAND, Benjamin F., 1st Lieut., Greenville, 114th Field Artillery, Camp Blanding, Fla.
HUDSON, Lawrence B., Jr., Captain, Hattiesburg, 106th Medical Regiment, Camp Blanding, Fla.
JENKINS, Charles R., Captain, Ellisville, 106th Medical Regiment, Camp Blanding, Fla.
JOHNSTON, Walter E., Captain, Vicksburg, 155th Inf., Camp Blanding.
KENDALL, Nathan F., Captain, Jackson, 155th Infantry, Camp Blanding.
LAMB, Roland D., 1st Lieut., Columbus, 114th Field Artillery, Camp Blanding, Fla.
LONG, Lawrence W., Major, Jackson, State Staff.
McCALIP, Hugh L., Major, Yazoo City, 106th Quartermaster Regiment, Camp Blanding, Fla.
McDILL, John E., Major, Jackson, 106th Med. Regt., Camp Blanding.
NOBLIN, William E., Jr., Captain, Jackson, 135th Infantry.
PURSER, Thomas, Jr., Captain, McComb, 106th Quartermaster Regiment, Camp Blanding, Fla.
RAMSAY, Frank L., Captain, Laurel, 106th Med. Regt., Camp Blanding.
RAY, Robert B., Captain, Kosciusko, 185th Inf., Camp Beauregard, La.
SIMPSON, Rufus K., 1st Lieut., Macon, 106th Medical Regiment, Camp Blanding, Fla.
SMITH, Robert W., Major, Canton, 155th Infantry, Camp Blanding, Fla.
WILLIAMS, Howard S., Jr., Captain, Jackson, 106th Medical Regiment, Camp Blanding, Fla.

MISSOURI

BARNES, Seth S., Captain, Owensville, 140th Infantry.
CLARK, Ray A., Captain, Kansas City, 110th Engineers, Camp Robinson.
DIMOND, Edgar A., Captain, Muskogee, Okla., 203d Coast Artillery (AA), Camp Hulen, Texas.
GALEOTA, William R., Captain, Maryville, 128th Field Artillery, Fort Jackson, S. C.
GIST, William L., Lieut. Colonel, Kansas City, State Staff.
HARWELL, James L., Captain, Poplar Bluff, 140th Infantry.
LEECH, Charles A., Jr., Captain, Columbia, 128th Field Artillery, Fort Jackson, S. C.
LIMBAUGH, Walter R., Major, Hayti, 140th Infantry.
LUNDGREN, Fred H., Jr., Captain, Fayette, 138th Inf., Camp Robinson.
McRAVEN, Claude, Captain, Marston, 140th Infantry.
PANETTIERE, Andrew H., 1st Lieut., St. Joseph, Special Troops, 35th Division, Camp Joseph T. Robinson, Ark.
PEUGNET, Hubert B., Captain, St. Louis, 138th Inf., Camp Robinson.
SCHAERRER, Hans, Lieut. Colonel, Kansas City, State Staff.
SILSBY, Don J., Captain, Mount Vernon, 203d Coast Artillery (AA), Camp Hulen, Texas.
SIMMONS, Leroy, Major, Sarcoxie, 203d Coast Artillery (AA), Camp Hulen, Texas.
STACY, Winton T., Captain, St. Joseph, Special Troops, 35th Division, Camp Joseph T. Robinson, Ark.
STONE, William E., Major, Boonville, 128th Fld. Artillery, Fort Jackson.
TINDALL, Robert N., 1st Lieut., Coon Rapids, Ia., 138th Infantry, Camp Joseph T. Robinson, Ark.
TOLLE, Cecil E., Major, Overland Park, Kan., 110th Engineers, Camp Joseph T. Robinson, Ark.
WADE, Frederick E., 1st Lieut., Kansas City, 110th Engineers, Camp Joseph T. Robinson, Ark.
WEINER, David O., Capt., Maspeth, N. Y., 138th Inf., Camp Robinson.
WHITE, Harvey L., Major, St. Louis, 138th Infantry, Camp Robinson.

MONTANA

CRAGO, Felix H., Captain, Great Falls, 116th Medical Regiment, Fort Lewis, Wash.
HOLCOMB, Mark D., 1st Lieut., Whitefish, 163d Infantry, Fort Lewis.

NEBRASKA

AINLAY, George W., Capt., Fairbury, 110th Med. Regt., Camp Robinson.
ANDERSON, James B., Major, Lincoln, 110th Medical Regiment, Camp Joseph T. Robinson, Ark.
ANDERSON, Ronald C., Major, Columbus, 110th Medical Regiment, Camp Joseph T. Robinson, Ark.
ATTWOOD, Norman H., Capt., Omaha, 134th Inf. (R), Camp Robinson.
BARTHOLOMEW, Philip H., Colonel, Lincoln, 110th Medical Regiment, Camp Joseph T. Robinson, Ark.
BROOKS, Earl B., Lieut. Colonel, Lincoln, 110th Medical Regiment, Camp Joseph T. Robinson, Ark.
EVANS, Carroll D., Captain, Columbus, State Staff.
EVANS, James N., Major, Columbus, 110th Med. Regt., Camp Robinson.
HOBBS, Elmer T., 1st Lieut., Lincoln, 110th Medical Regiment, Camp Joseph T. Robinson, Ark.
HUBER, Paul J., Captain, Exeter, 110th Med. Regt., Camp Robinson.
INGHAM, Charles G., 1st Lieut., Norfolk, 110th Medical Regiment, Camp Joseph T. Robinson, Ark.
JOHNSON, Robert W., Capt., Lincoln, 110th Med. Regt., Camp Robinson.
JOHNSON, Rodney K., Major, Friend, 110th Medical Regiment, Camp Joseph T. Robinson, Ark.
KUNKEL, Lloyd N., Captain, Weeping Water, 110th Medical Regiment, Camp Joseph T. Robinson, Ark.
MATSON, Roy M., 1st Lieut., Holdrege, 110th Medical Regiment, Camp Joseph T. Robinson, Ark.
MERIDETH, John A., Major, Lincoln, 110th Medical Regiment, Camp Joseph T. Robinson, Ark.
MOSSMAN, Frank D., 1st Lieut., Omaha, 134th Infantry (R), Camp Joseph T. Robinson, Ark.
OPPEN, Ralph L., 1st Lieut., Omaha, 134th Inf. (R), Camp Robinson.
SALTER, George B., Captain, Norfolk, 110th Medical Regiment, Camp Joseph T. Robinson, Ark.
SHAW, Wilfred L., Capt., Hastings, 110th Med. Regt., Camp Robinson.
SHRECK, Horace W., Captain, Holdrege, 110th Quartermaster Regiment, Camp Joseph T. Robinson, Ark.
TEPLEY, Gene L., 1st Lieut., Howells, 110th Medical Regiment, Camp Joseph T. Robinson, Ark.
TOWNLEY, Robert H., 1st Lieut., Omaha, 134th Infantry (R), Camp Joseph T. Robinson, Ark.

NEVADA

HOOD, Dwight L., Major, Reno, State Staff.

NEW HAMPSHIRE

BARTON, Donald G., Captain, Concord, 197th Coast Artillery (AA), Camp Hulen, Texas.
BREMNER, Robert M., 1st Lieut., Manchester, 172d Field Artillery, Camp Blanding, Fla.
DAHLGREN, Carl A., Major, Concord, 197th Coast Artillery (AA), Camp Hulen, Texas.
FISKE, Reginald E., Major, Manchester, 172d Field Artillery, Camp Blanding, Fla.
GALLOWAY, Raymond P., 1st Lieut., Pembroke, 197th Coast Artillery (AA), Camp Hulen, Texas.
HALLISEY, Dennis L., Captain, Nashua, 172d Field Artillery, Camp Blanding, Fla.
KAPOPOULOS, Garifalos J., Major, Manchester, 172d Field Artillery, Camp Blanding, Fla.
WHEELER, John S., 1st Lieut., Concord, State Staff.

NEW JERSEY

CANUSO, Nicholas A., 1st Lieut., Camden, 114th Inf., Fort Dix, N. J.
CLUNAN, Ambrose P., 1st Lieut., Trenton, 119th Med. Regt., Fort Dix.
CORSON, Kenneth E., Captain, Vineland, 157th Field Artillery.
COTTON, Henry A., Jr., Capt., Trenton, 119th Med. Regt., Fort Dix.
CUNNINGHAM, Charles, Jr., Major, Vineland, 165th Field Artillery, Fort Dix, N. J.
De FUSCO, Gaetano T., Capt., Jersey City, 122d Separate Battalion, Coast Artillery, (AA) Fort Du Pont, Del.
ELIAS, Elmer J., Captain, Trenton, 119th Med. Regt., Fort Dix, N. J.
ENION, George A., Colonel, Sea Girt, 119th Med. Regt., Fort Dix, N. J.
FINEGAN, Paul J., Major, Trenton, Medical Department, State Staff.
FLAHERTY, Edward M., 1st Lieut., Jersey City, 119th Quartermaster Regiment.
FRANZONI, Andrew E., Capt., Trenton, 119th Med. Regt., Fort Dix.
FRAZEE, William H., Jr., 1st Lieut., Toms River, 119th Medical Regiment, Fort Dix, N. J.
GILLIGAN, Walter W., 1st Lieut., Nutley, Special Troops, 44th Division.
GRANGER, James R., 1st Lieut., Trenton, 372d Infantry.
GROESCHEL, August H., Capt., Sussex, 102d Cav., Fort Jackson, S. C.
HOFER, William R., 1st Lieut., Audubon, 114th Inf., Fort Dix, N. J.
HORLAND, Aaron H., Captain, Newark, 119th Observation Squadron.
HOWELL, Thomas W., Capt., Belleville, 102d Cav. Fort Jackson, S. C.
KRAUT, Arthur M., Captain, Jersey City, 113th Inf., Fort Dix, N. J.
LEVINE, David B., Major, Paterson, 113th Infantry, Fort Dix, N. J.
MC CARTHY, William P., 1st Lieut., Trenton, 119th Medical Regiment, Fort Dix, N. J.
MICHELSON, Henry, Captain, Paterson, 113th Inf., Fort Dix, N. J.
NEIMAN, Watson E., Capt., Point Pleasant, 114th Inf., Fort Dix, N. J.
O'GORMAN, William D., 1st Lieut., Greystone Park, 112th Field Artillery, Fort Bragg, N. C.
PEPE, Salvatore A., 1st Lieut., Trenton, 119th Med. Regt., Fort Dix.
PIERSON, Joseph R., Capt., Hopewell, 119th Med. Regt., Fort Dix, N. J.
SMITH, Byron J., Major, Newark, 102d Cavalry, Fort Jackson, S. C.
STILLMAN, Eugene H., Major, Haddonfield, 157th Field Artillery.
STORACI, Frank S., Capt., Trenton, 119th Med. Regt., Fort Dix, N. J.
WALSH, Thomas J., Major, Trenton, 119th Med. Regt., Fort Dix, N. J.
WAYMAN, Bernard R., Capt., Trenton, 119th Med. Regt., Fort Dix,
WILSON, Lester R., Major, Camden, 114th Infantry, Fort Dix, N. J.
WYLLY, Martin D., 1st Lieut., Englewood, 104th Engineers, Fort Dix.
YAEGER, Leslie A., Lieut. Colonel, Trenton, 119th Med. Regt., Fort Dix.

NEW MEXICO

COLVARD, George T., Major, Deming, 200th Coast Artil., Ft. Bliss, Tex.
HOOVER, Thomas B., Captain, Tucumcari, 104th Anti-Tank Battalion, Fort Sam Houston, San Antonio, Texas.
LONG, Julian O., Captain, Albuquerque, 200th Coast Artillery, Fort Bliss.
RILEY, Richard M., Captain, Albuquerque, 205th Coast Artillery (AA), Fort Bliss, Texas.

(To be continued)

SCHOOL OF AVIATION MEDICINE

Another course of instruction to qualify medical officers as aviation medical examiners began at the School of Aviation Medicine, Randolph Field, Texas, on July 1. The course will continue for three months. The names of the officers enrolled, together with the stations to which they are assigned, follows:

ADLER, Morton W., 1st Lieut., Fort Leonard Wood, Mo.
BAER, Erwin J., 1st Lieut., Pendleton Air Base, Pendleton, Ore.
BARRETT, Maurice E., 1st Lieut., Randolph Field, Texas.
BEIL, Martin C., 1st Lieut., McChord Field, Wash.
BENJAMIN, Edwin G., 1st Lieut., Fort Sam Houston, Texas.
BENSON, George B., 1st Lieut., Fort Benning, Ga.
BLOUNT, Lester L., 1st Lieut., March Field, Riverside, Calif.
BRENNER, William R., 1st Lieut., Hamilton Field, Calif.
BROWN, Andrew P., 1st Lieut., Fort Riley, Kan.
BROWN, Charles H., 1st Lieut., Air Base, Fresno, Calif.
BROWN, John Z., Jr., 1st Lieut., Fort George Wright, Wash.
BROWN, William E., 1st Lieut., Orlando Air Base, Orlando, Fla.
BURNS, John K., 1st Lieut., Fort Lewis, Wash.
BURT, Charles W., Captain, Camp Livingston, La.
CAMPBELL, Clayton C., Jr., 1st Lieut., Air Corps Training Detachments, Ontario, Calif.
CARBONE, Ralph, 1st Lieut., Camp Livingston, La.
CHILDS, Wallace E., 1st Lieut., Fort Knox, Ky.
CLARK, Doyce M., 1st Lieut., Fort Sill, Okla.
COLEMAN, Robert R., 1st Lieut., Alabama Institute of Aeronautics, Tuscaloosa, Ala.
COLQUITT, Alfred O., Jr., 1st Lieut., Advanced Flying School, Selma, Ala.
CONAN, Mark E., 1st Lieut., Mitchel Field, L. I., N. Y.
CONEN, Warren J., 1st Lieut., Bowman Field, Ky.
CORGILL, Donald A., 1st Lieut., Westover Field, Mass.
CRAIN, Alfred P., 1st Lieut., Barksdale Field, La.
CRANE, James E., 1st Lieut., Randolph Field, Texas.
DAY, Roy W., Jr., 1st Lieut., Albuquerque Air Base, Albuquerque, N. M.
DAYWITT, Alvin L., Captain, Fort Sill, Okla.
DeMICHELE, Roland V., Captain, Camp Forrest, Tenn.
DENGROVE, Edward, 1st Lieut., Morrison Field, West Palm Beach, Fla.
DOAK, Alfred D., 1st Lieut., Randolph Field, Texas.
DOUGHERTY, Francis M., 1st Lieut., Camp Blanding, Fla.
DOUGHERTY, John E., 1st Lieut., Randolph Field, Texas.
EVANS, David S., 1st Lieut., Fort Benning, Ga.
FASOLDT, Lawrence O., 1st Lieut., Randolph Field, Texas.
FOX, Nathan S., Captain, Manchester Air Base, Manchester, N. H.
GAILLARD, Ernest, Jr., 1st Lieut., Camp Blanding, Fla.
GODDARD, Philip A., 1st Lieut., Bangor Air Base, Bangor, Maine.
GRANT, Charles P., 1st Lieut., Eglin Field, Valparaiso, Fla.
GROGAN, Francis R., 1st Lieut., Randolph Field, Texas.
GUENON, William A., 1st Lieut., Camp Blanding, Fla.
HALL, James B., 1st Lieut., Camp Polk, La.
HALPERIN, Louis, 1st Lieut., Fort Douglas, Utah.
HARRISON, Charles S., 1st Lieut., Bolling Field, D. C.
HARTWICK, Fred W., 1st Lieut., Goodfellow Field, San Angelo, Texas.
HELLER, Harold, 1st Lieut., Stockton Field, Calif.
HILL, Edward R., 1st Lieut., Advanced Flying School, Phoenix, Ariz.
HOERNSCHEMEYER, Joseph L., Captain, Fort Sam Houston, Texas.
HOFFMAN, Richards H., 1st Lieut., Army Air Base, Windsor Locks, Conn.
JACOBSON, Harry, 1st Lieut., Ellington Field, Texas.
JOHNSON, Cyrus C., Captain, Maxwell Field, Ala.
JONES, Warren C., 1st Lieut., Gunter Field, Montgomery, Ala.
KASLOW, Arthur L., 1st Lieut., Mather Field, Calif.
LEONE, Peter P., 1st Lieut., Camp Blanding, Fla.
LUKE, Edward A., 1st Lieut., McChord Field, Wash.
McGEE, William J., 1st Lieut., Fort Benning, Ga.
MAISLEN, Sidney E., 1st Lieut., 152d Observation Squadron, Hillsgrove, R. I.
MARCHMAN, Oscar M., Jr., 1st Lieut., Kelly Field, Texas.
MASLER, Sherman, 1st Lieut., Moffett Field, Calif.
MILLIS, Jack W., 1st Lieut., Selfridge Field, Mich.
NACHTIGALL, Henry B., 1st Lieut., Fort McClellan, Ala.
NEFF, Francis Robert, Captain, Baer Field, Fort Wayne, Ind.
OSTROVE, Lester L., 1st Lieut., Jackson Air Base, Jackson, Miss.
PEARSON, John B., 1st Lieut., Station Hospital, Fort Sam Houston, Texas.
RAPPAPORT, Irving, 1st Lieut., Cochran Field, Macon, Ga.
RAYMOND, Frank K., 1st Lieut., Chanute Field, Ill.
RICE, Albert J., 1st Lieut., Randolph Field, Texas.
RICHARDSON, George S., 1st Lieut., Fort Bliss, Texas.
RICHARDSON, Guy C., Captain, Fort McClellan, Ala.
ROBINSON, Harold A., Captain, Scott Field, Ill.
ROSENBLUM, Earl I., 1st Lieut., Will Rogers Field, Okla.
RYAN, Bert M., Captain, Kelly Field, Texas.
ST. CLAIR, Alexander A., 1st Lieut., Middletown Air Depot, Middletown, Pa.
SCHLESINGER, Henry A., 1st Lieut., MacDill Field, Fla.
SCHWEITZER, Martin, 1st Lieut., Baton Rouge Air Base, La.
SHAPIRO, Lester, 1st Lieut., Meridian Air Base, Meridian, Miss.
SHEA, Andrew W., 1st Lieut., Scott Field, Ill.
SIMMANG, Arthur V., 1st Lieut., Brooks Field, Texas.
SMITH, George L., 1st Lieut., Mississippi Institute of Aeronautics, Jackson, Miss.
SMOLENS, Nathan M., Captain, Air Base, Tucson, Ariz.
SOHMER, Abram, 1st Lieut., Savannah Air Base, Savannah, Ga.
SPEED, Henry K., 1st Lieut., Lowry Field, Colo.
SPRONG, Aaron A., 1st Lieut., Fort Leonard Wood, Mo.
TAKSA, David S., 1st Lieut., Tallahassee Air Base, Tallahassee, Fla.
THOMPSON, Frank V., 1st Lieut., Langley Field, Va.
VANNETER, James C., Captain, Recruiting Service, Fort Hayes, Columbus, Ohio.
VOSS, Bernard J., 1st Lieut., March Field, Calif.
WHITLOW, Joseph E., Major, McChord Field, Wash.
WIER, David T., 1st Lieut., Kelly Field, Texas.
WILLIGER, Irwin F., 1st Lieut., Patterson Field, Ohio.
WILUCKI, Melvin R., 1st Lieut., Adams Field, Little Rock, Ark.

MORE NEW NAVY MEDICAL OFFICERS

The following candidates were issued appointments as Acting Assistant Surgeons for intern training in the Medical Corps in the Navy, with rank of Lieutenant (junior grade), to rank from the dates indicated:

TO RANK FROM JUNE 25

BALLENBERGER, Louis P., Hamlet, N. C.
BERGMAN, George R., Los Angeles.
COLE, Clifford B., Somerville, Tenn.
EDGAR, Erwood G., Toledo, Ohio.
EMMETT, John E., New York.
FOCHTMAN, Thomas W., Petoskey, Mich.
FREITAS, Eugene L., Detroit.
GERBER, Marvin L., Menloe Park, Calif.
HANSEN, Wayne S., Chico, Calif.
HAYES, Egbert Morris, Syracuse, N. Y.
JAHNKE, Leonard P., Detroit.
KIMBER, James H., Fayetteville, N. Y.
KLEY, Edward C., Long Island, N. Y.
KRAFT, Frederick W., Chicago,
LAUGHLIN, Henry P., Hagerstown, Md.
MOORE, Grover L., Portsmouth, Va.
MORDAUNT, Richard H., St. Joseph, Mo.
MORRICAL, Russell J., Logansport, Ind.
NOVA, Philip L., Detroit.
O'BRIEN, John J., Buffalo.
PARRISH, Richard K., Decatur, Ind.
SCOFIELD, Dean S., San Diego, Calif.
SEARS, David R., Palo Alto, Calif.
SHERMAN, John J., Ironton, Ohio.
SPRUNT, Charles W., Wilmington, N. C.
VIRNIG, Richard P., New Richland, Minn.

TO RANK FROM JULY 2

BRUNO, John R., Conshohocken, Pa.
GAMBLE, Donald L., Canonsburg, Pa.
FUSCO, John A., Los Angeles.
LEWIS, Gwilym B., Redlands, Calif.
PLETTA, Fred A., Berkeley, Calif.
SCHUGMANN, Robert F., Ann Arbor, Mich.

NEW NAVAL HOSPITALS

Three new naval hospitals are scheduled to open in July. The four hundred and twenty bed hospital at Corpus Christi, Texas, which will primarily serve the new naval air station, will be in charge of Capt. W. L. Mann, M. C., and the four hundred bed hospital at Jacksonville, Fla., which also will primarily serve a naval air station, will be in charge of Capt. Lester L. Pratt, M. C. The new one hundred and thirty bed hospital at Quantico, Va., will give the marine barracks at that station a hospital equipped to care for many of the cases which now must go to Washington, D. C.

VITAMIN TABLETS FOR SOLDIERS

The War Department announced, July 11, that U. S. Army troops serving in far northern climates will have vitamin tablets included in their daily rations as protection against nutritional diseases. The Surgeon General's Office in collaboration with the National Research Council has authorized the issue of two multiple vitamin tablets or capsules daily for every soldier serving in arctic regions. The tablets will contain vitamins A, B_1, B_2, C and D and nicotinic acid compound.

ARMY GENERAL HOSPITAL AT DANVILLE, KY.

The War Department announced, July 11, the award of a contract covering the construction of a two hundred and fifty bed general hospital unit at Danville, Ky., at an estimated cost of $330,943. The unit will be located adjacent to the newly constructed hospital facilities being leased at a nominal rental from the commonwealth of Kentucky.

ORGANIZATION SECTION

MEDICAL LEGISLATION

MEDICAL BILLS IN CONGRESS

Change in Status.—S. 1569 has passed the Senate, providing for the termination of leases covering property occupied for professional, business, agricultural or similar purposes where any such lease has been or may be executed on his own behalf by any person who is or may hereafter be in military service by virtue of the provisions of the Selective Training and Service Act or the Public Resolution authorizing the President to call out the reserve units.

Bills Introduced.—H. R. 4986, introduced by Representative Welch, California, proposes to amend the Longshoremen's and Harbor Workers' Compensation Act. Among other changes proposed, the pending bill would provide for the establishment of panels "of qualified physicians, surgeons, specialists, consultants, laboratory x-ray or other technicians, compensation medical bureaus and laboratories" and would authorize an injured employee to "select to treat him any physician authorized by the Commission to render medical care." The commission would furthermore be authorized to establish schedules of fees to be charged for services rendered to injured employees. H. R. 5236, introduced by Representative Buckler, Minnesota, proposes to grant pensions to certain soldiers, sailors and marines who served in the Pulajane and Moro campaigns and other uprisings in the Philippine Islands from July 16, 1903 to Dec. 31, 1913. The bill provides that the same privileges of hospitalization and medical care and treatment accorded to honorably discharged veterans of the Spanish-American War, the Philippine Insurrection, Boxer Rebellion and World War shall be extended to honorably discharged veterans of the Pulajane and Moro campaigns.

MEDICAL ECONOMIC ABSTRACTS

ILLNESS AND ACCIDENTS IN RELATION TO HOUSING CONDITIONS

The United States Public Health Service continues to analyze the results of the National Health Survey in relation to various factors.[1] It is assumed that this survey gave an accurate picture of morbidity. The illnesses so reported have been distributed according to the degree of overcrowding into three classifications. The distribution of the population within these classifications was as follows:

	Per Cent
A. One person or less per room	74.9
B. More than 1 person per room but not more than 1½	16.7
C. More than 1½ persons per room	8.3
	100.0

Those with an income above the $1,500 level appear to have been eliminated, and "attention is centered upon the lower income groups." The comment on the results of the analysis is as follows:

> The inferences to be drawn from this material must necessarily be somewhat speculative in nature, because of the extreme intricacy of the whole question of the relation between housing and health.
>
> The many complicating factors the effect of which cannot be eliminated satisfactorily—differences of income, of race, of educational and intelligence level, and of housekeeping efficiency, to name but a few—constitute a serious limitation on the interpretation of the data. The most serious limitation perhaps lies in the element economic status. Sometimes disease or impairment cuts down income or prevents entirely the earning of a livelihood and so forces families into poor housing, the only kind they can afford. Sometimes low income causes or perpetuates disease by making impossible an adequate diet, proper medical care (at home or in institutions) and other essentials of healthful living. With low income often goes exposure to unhealthful occupations. As a consequence of these inextricably interwoven factors, persons badly housed have excessive rates of illness and mortality quite apart from the influence of the housing conditions themselves.
>
> In this report an attempt has been made to eliminate the effect of economic differences by making comparisons within certain broad income classes; but it is apparent that, within each of these classes, differences in effective income with degree of crowding, together with a tendency for families overburdened by disease to drift into the crowded households, have prevented the complete isolation of the effect of housing itself. In fact, it may be stated categorically that no conclusion as to the precise role of housing per se in the illness experience of low income families is possible from the material presented in this report, or indeed from any data now available. This statement is not to be interpreted as meaning that bad housing does not affect health. It is well recognized that there are certain essentials of a healthful home environment—a sufficient supply of pure water, sanitary sewage disposal, sufficient ventilation, heat and light, space enough for ordinary family living, absence of excessive dampness, screening against mosquitoes and flies, freedom from fire and other accident hazards, adequate playgrounds and sunshine for children. Health is more than the mere absence of outright disease; it is a state of being in which all physical and mental processes approach their highest efficiency. That is possible only under satisfactory conditions of housing.

Despite the impossibility of assessing the precise effect of housing conditions, this report has established an important broad association between housing and health. Illness rates were found to be higher in congested households, especially for certain diagnoses; disabling digestive diseases were substantially more frequent in households not having a private inside flush toilet; and serious home accidents rose with drop in rental. Essentially, because of the interrelated nature of the indices, this association is to be regarded as one between illness and poor housing generally. What has been demonstrated most clearly is that this excess illness rate, to whatever extent it is due to bad housing itself, occurs in the low income, poorly housed populations, who are least able to meet the burden of disease.

1. Britten, R. H., and Altman, Isidore: Illness and Accidents Among Persons Living Under Different Housing Conditions, Pub. Health Rep. 56: 609 (March 28) 1941.

COMMUNITY MEDICAL CARE, INC., OF NEW YORK

A new nonprofit medical indemnity corporation called Community Medical Care, Inc., received a permit from the New York State Department of Insurance on June 4. According to an announcement by Dr. S. S. Goldwater, president of the Associated Hospital Service of New York, this new contributory plan will provide hospital ward service and all the medical service needed for satisfactory clinical treatment for workers with limited incomes and their dependents. It will be managed by a board of directors, under the presidency of Dr. I. Ogden Woodruff, consisting of sixteen physicians and eight laymen. Six of these physicians are former presidents of county medical societies in Greater New York.

The plan has been approved in principle by a special committee of the coordinating council of five county medical societies of Greater New York and by the State Insurance Department and the Department of Social Welfare.

This new plan will offer ward hospital service for $6 per annum for individuals and $13.50 for families. Additional payments of the same amount to the Community Medical Care, Inc., will cover medical fees. The rates for combined hospital and all necessary medical care during the subscriber's hospital stay will therefore be $12 per annum for individuals and $27 per annum for families including all children under 18 years.

The plan will be limited to single persons with incomes of $1,200 or less, but subscriptions providing maternity care as well as general medical and surgical service will be available to husbands and wives with combined incomes of $1,680 and to families including children with incomes of $2,100 or less.

Hospital service and medical care will be offered only under a combined contract. Administrative expenses will be shared by the Associated Hospital Service and Community Medical Care. Subject to hospital rules, subscribers will have free choice among participating hospitals in which subscribers' physicians now have, or may hereafter acquire, the privilege of caring for patients. It is expected that this provision will lead to an increase of private and semiprivate courtesy staffs.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ALABAMA

Society News.—The Northwestern division of the state medical association was addressed in Moulton, June 26, among others, by Drs. Andrew L. Glaze, Birmingham, on "Prophylactic Treatment of Acne Vulgaris" and William N. Jones, Birmingham, "Cancer of the Female Reproductive Organs."

Personal.—Dr. Iva G. Murphy, Eutaw, has been appointed health officer of Greene County.——Dr. Elisha M. Moore, Centerville, is now health officer of Sumter County.——Dr. John E. Garrison has resigned as chief of staff and chief of the obstetric and gynecologic departments of the Salvation Army Home and Hospital, Birmingham, after twenty-nine years' service. He will continue to serve the hospital in an emeritus capacity.——Dr. Rutherford O. Ingham, Athens, has resigned as health officer of Limestone County to accept a similar position in Johnson City, Washington County, Tenn. Dr. Frank M. Hall, Athens, who has been on leave of absence doing graduate work at Johns Hopkins University, will return as health officer of Limestone County.——Dr. Mary Walton, Opelika, has been named health officer for Chilton County, succeeding Dr. Robert W. Crowell, Clanton.

CALIFORNIA

Society News.—Dr. Logan Clendening, Kansas City, Mo., discussed "Some Memorials of Medicine in America" before the Hollywood Academy of Medicine, July 10.——A symposium on fluid therapy was presented by Drs. James B. Graeser, Paul P. E. Michael, Olin H. Garrison and Arthur J. Hunnicutt before the Alameda County Medical Association in Oakland, June 16.

Memorial Blood Bank Opened.—The Irwin Memorial Blood Bank of the San Francisco County Medical Society opened, June 17, and its services are now available for local as well as war relief purposes. The Blood Bank Commission welcomes donors at the society headquarters and especially invites physicians. On the opening day many prominent persons of San Francisco and Oakland gave donations of blood, and on the following day the Junior Chamber of Commerce turned out in force for contributions. A description of the Irwin Memorial Blood Bank appeared in THE JOURNAL, April 5, page 1587.

Study of Applications of Cyclotron to Medicine.—The Columbia Foundation has given $50,000 to the University of California, Berkeley, for the study of applications of the cyclotron to medicine. The gift will be known as the Columbia Fund for Medical Physics and will enable Berkeley scientists to intensify studies which have shown promise of providing new treatments for disease. The university will now be able to support for five years a research team of five men trained in as many fields, $10,000 to be allotted each year, effective immediately. Dr. John H. Lawrence, San Francisco, will be in charge of the medical investigations with the cyclotron. The Columbia Foundation was organized by a San Francisco family which prefers to remain anonymous.

COLORADO

Society News.—Dr. Gerald M. Frumess, Denver, addressed the Northeast Colorado Medical Society, June 12, in Sterling on "Treatment of Common Diseases of the Skin."—Drs. Whitney C. Porter and Rex L. Murphy, Denver, addressed the Northwestern Colorado Medical Society in Steamboat Springs, May 29, on "Treatment of Industrial Eye Injuries" and "Management of Sinus Infections" respectively.——Dr. Robert J. Groom, Grand Junction, discussed "Artificial Immunization in Childhood" at the May meeting of the Mesa County Medical Society, in Fruita.——Dr. Douglas W. Macomber, Denver, addressed the San Luis Valley Medical Society in Alamosa, June 17, on "Wound Healing and the Practical Application of Skin Grafting."

New Units at Glockner Hospital.—Recent additions to the Glockner Sanatorium and Hospital, Colorado Springs, include a new nurses' home and an aniseikonia laboratory. The nurses' home is the gift of Mrs. Verner Z. Reed of Denver in memory of her daughter, Marjorie Reed, who during the first World War studied Red Cross nursing under the auspices of the hospital. It is a three story brick structure, containing rooms for one hundred and twenty-seven nurses, a solarium, an auditorium with a capacity for two hundred and fifty persons, four small parlors, a large music room, a library, a small private chapel, and other modern conveniences and facilities. The aniseikonia laboratory is under the direction of Dr. Von Haller Brobeck and is one of about ten that are now being planned throughout the country.

ILLINOIS

Personal.—Dr. Philip S. Waters, Alton, has been appointed acting managing officer of the Peoria State Hospital, Peoria, succeeding Dr. Bernard Skorodin, who has been acting manager. Dr. Waters once served as managing officer of the Lincoln State School and Colony.

Society News.—Recently elected officers of the Illinois Psychiatric Society include Drs. Walter H. Baer, Manteno, president; Paul L. Schroeder, Chicago, vice president, and Eugene I. Falstein, Chicago, secretary.——Dr. Leo K. Campbell, Chicago, discussed "Management of Emergencies in Diabetics" before the Lake County Medical Society in May.

Chicago

Course in Electrocardiography.—The cardiovascular department of Michael Reese Hospital is offering a two weeks course in electrocardiography, August 18-30, under the direction of Dr. Louis N. Katz. Additional information may be secured from the hospital.

Will Provides for Scientific Research.—Under the will of George Herbert Jones, one of the founders of the Inland Steel Company, about $1,000,000 has been set aside to "promote scientific research to alleviate human suffering, improvement of living and working conditions, improvement of facilities for recreation, and improvement of hygiene and prevention of disease, and to assist care of children, the sick, aged, and helpless; reformations of victims of alcohol and narcotics, ex-convicts and wayward persons, and to facilitate work in social and domestic hygiene." The will directs that the income and not more than 10 per cent of the principal are to be disbursed by the Chicago Community Trust to charities and educational institutions which "best make for the mental, moral, intellectual and physical improvement" of residents of the state. Mr. Jones during his lifetime gave about $4,000,000 to education and medicine.

Investigation of Outbreak of Poliomyelitis.—Fifteen cases of poliomyelitis in the western suburbs of Chicago since June 26 led to the formation of a special committee to investigate the outbreak with the cooperation of the National Foundation for Infantile Paralysis. The members of the committee will be Drs. Edward A. Piszczek, health officer of Cook County, chairman; Morris Fishbein, Editor of THE JOURNAL; Herman N. Bundesen, health commissioner; Irving S. Cutter, dean, Northwestern University Medical School; Winston H. Tucker, health officer of Evanston; Robert A. Black, chairman of the health department advisory committee of the Chicago Medical Society; Sidney O. Levinson, director of the Samuel Deutsch Serum Center at Michael Reese Hospital, and Roland R. Cross, Springfield, director of the state department of public health; Arthur E. Gorman, engineer of water purification, and Howard J. Shaughnessy, Ph.D., director of laboratories for the state health department. Dr. Shaughnessy will be in charge of the investigation, for which the National Foundation for Infantile Paralysis will supply 50 monkeys from the virus research centers at Ann Arbor and Lansing, Mich. The first cases were traced to a child in Western Springs who sold lemonade to her friends. She and four of her customers acquired the disease, and the other patients in La Grange, Park Ridge, Oak Park and Berwyn were found to have had some direct or indirect contact with the original patient, it was said.

INDIANA

Changes in Health Officers.—Dr. James B. Griffith, health officer of Crawfordsville, has been appointed in charge of the Montgomery County health department, succeeding the late Dr. Fred A. Dennis.——Dr. Russell P. Reynolds, Elizabethtown, has resigned as health commissioner of Bartholomew County; he will engage in the practice of medicine at Garrett, it is reported.——Dr. Clint C. Sourwine, Brazil, has been made health officer of Clay County to succeed Dr. John M. Palm, Brazil, who has been called to army service.——Dr. Cecil E. Johnson, Rensselaer, has been appointed health officer of Jasper County, succeeding the late Dr. Arthur R. Kresler. Dr. Ed N. Loy, health officer of Rensselaer, has been acting health officer of the county.

IOWA

Annual Summer Meeting.—The Upper Des Moines Medical Society held its annual summer meeting at Templar Park on Spirit Lake, July 10. The speakers included:

Dr. Harold W. Morgan, Mason City, Pathology of Intestines.
Dr. Allan B. Phillips, Des Moines, Roentgen Diagnosis of Intestinal Conditions.
Dr. Roy W. Fouts, Omaha, Medical Preparedness.
Dr. William D. Paul, Iowa City, Common Diseases of the Lower Intestinal Tract.
Dr. John B. Erich, Rochester, Minn., Traumatic Injuries of the Face.
Dr. George H. Scanlon, Iowa City, Acute Surgical Conditions in the Abdomen.
Dr. Walter C. Alvarez, Rochester, Treatment of Nervous Indigestion.
Dr. William R. Lovelace II, Rochester, Increased Risk of Patient Flying at High Altitude.

KENTUCKY

District Meeting.—A meeting of the Tenth Councilor District of the Kentucky State Medical Association was held in Lexington, July 17, with Drs. Rettig Arnold Griswold and Maurice G. Buckles, Louisville, as the speakers on "Compound Fractures" and "Wheeze, Cough and Hoarseness" respectively. Dr. Elmer L. Henderson, Louisville, president-elect of the state association, also made an address.

Society News.—Drs. Joseph Andrew Bowen and Jacob S. Bumgardner addressed the Jefferson County Medical Society, Louisville, June 2, on "Urology in Infancy and Childhood" and "Common Lesions of the Larynx" respectively.——Drs. Philip F. Barbour and William W. Nicholson, Louisville, recently conducted a pediatric conference as guests of the Union County Medical Society, Morganfield. Dr. Barbour discussed "Chronic Heart Disease" and "Diarrhea and Dysentery"; Dr. Nicholson's subjects were "Feeding Problems" and "Newer Drugs in the Treatment of Pneumonia."

LOUISIANA

Postgraduate Course for Negro Physicians.—The sixth annual postgraduate course for Negro physicians was presented at the Flint-Goodridge Hospital of Dillard University, New Orleans, June 16-27. Instruction was given by members of the staffs of the medical schools of Louisiana State and Tulane universities and the following guest speakers: Drs. Theodore K. Lawless, Chicago; Peter M. Murray, New York; John W. Chenault, Tuskegee Institute, Ala., and Hugh A. Browne, Alexander, Ark. Clinics, demonstrations and lectures made up the program.

MARYLAND

Personal.—Dr. John M. T. Finney, emeritus professor of surgery, Johns Hopkins University School of Medicine, Baltimore, was awarded the honorary degree of doctor of letters by Jefferson Medical College, Philadelphia, June 6, at which time Dr. Finney gave the commencement address, entitled "The True Province of the Doctor." Dr. Warfield T. Longcope, professor and director of the department of medicine at Johns Hopkins, received the degree of doctor of science from the University of Rochester, Rochester, N. Y., at the commencement exercises, June 16.

Election of Officers.—Dr. Robert Lee Hall, Pocomoke City, was elected president of the Medical and Chirurgical Faculty of Maryland at its recent meeting in Baltimore, succeeding Dr. Harvey B. Stone, Baltimore. Other officers include Drs. Maurice C. Pincoffs, Baltimore; William F. Williams, Cumberland, and Jacob W. Bird, Sandy Spring, vice presidents; Richard T. Shackelford, Baltimore, secretary, and Joseph Albert Chatard, Baltimore, treasurer. The 1942 session will be in Baltimore, April 28-30.

Sodium Fluoride Used as Insecticide Must Be Colored.—The Maryland State Board of Health adopted a regulation, May 29, requiring that insecticides containing sodium fluoride must be colored nile blue as a warning of their poisonous nature. A recent tragedy in which white sodium fluoride was accidentally used in pancakes and killed twelve people, as well as the finding of quantities of this substance in hotel, restaurant and hospital kitchens, led to the new order. Manufacturers of insecticides and commercial fumigators have been informed of the change, and all food establishments are expected to remove the uncolored sodium fluoride from their premises.

MICHIGAN

Fraudulent Use of Diploma.—Wayne University announces that a former summer school student, Gershon Bloom, has made fraudulent use of the Wayne University seal and transcript in making application to various medical colleges. The case has been placed in the hands of the disciplinary authorities of the Detroit Public School System, of which Wayne University is a part.

Annual Alumni Clinic.—The alumni of Wayne University College of Medicine held their annual one day clinic, June 11, at the Detroit Institute of Art with the following participants:

Dr. Charles W. Mayo, Rochester, Minn., Carcinoma of the Lower Colon and Rectum: Surgical Treatment.
Dr. William Magner, Toronto, Ont., Pathogenesis of Anemia.
Dr. Frank D. Dickson, Kansas City, Mo., Surgical Treatment of Arthritis.
Dr. Walter Lincoln Palmer, Chicago, Diagnosis and Treatment of Gastric Disease.
Dr. Philip D. Woodbridge, Boston, Recent Developments in Anesthesia.

At the banquet at the Hotel Statler in the evening Wallace R. Deuel, foreign correspondent for the Chicago *Daily News*, spoke on "The World Counter Revolution." Malcolm W. Bingay, editorial director, Detroit *Free Press*, was toastmaster.

Conference on Serology and Syphilis Control.—The American Association of Industrial Physicians and Surgeons in cooperation with the U. S. Public Health Service and the American Social Hygiene Association sponsored a conference on serology and syphilis control at the Michigan Union, Ann Arbor, June 7. The speakers included:

Dr. George H. Gehrmann, Wilmington, Del.
Dr. Harold A. Vonachen, Peoria, Ill.
Dr. Udo J. Wile, Ann Arbor.
Reuben L. Kahn, Sc.D., Ann Arbor.
Drs. Walter M. Simpson, Herbert Worley Kendell and Donald L. Rose, Dayton, Ohio.
Dr. Earle A. Irvin, Cleveland.
Dr. Millard C. Hanson, Pittsburgh.
Dr. Otis L. Anderson, district number 3, U. S. Public Health Service.
Dr. James H. Gordon, Silver Spring, Md., captain, medical reserve corps, U. S. Army.
Rear Admiral Harold W. Smith, medical corps, U. S. Navy.
Dr. Raymond A. Vonderlehr, Washington, D. C.
Dr. John Sundwall, Ann Arbor.
Dr. Charles Walter Clarke, New York.
Dr. Clarence D. Selby, Detroit.
Dr. Cassius H. Watson, New York.

MINNESOTA

Course on Health Problems in Industry.—The Center for Continuation Study of the University of Minnesota, Minneapolis, will offer a course on health problems in industry, August 4-6, recommended for industrial nurses, physicians and welfare workers. A staff of twenty-four physicians, nurses and other workers in industrial welfare will present such topics as soft tissue injuries and fractures, hand infections and injuries, burns, heart disease, occupational dermatitis, prevention and treatment of the common cold and care of the feet. There will also be a demonstration of fatigue laboratory studies and a round table discussion of principles of first aid. At one evening meeting Drs. Jay Arthur Myers and Harry G. Irvine will discuss case finding in tuberculosis and venereal disease, respectively, and the second evening Dr. Carl M. Peterson, secretary, Council on Industrial Health of the American Medical Association, Chicago, will speak on "Benefits of an Industrial Health Program." Registration for the course is $2 and tuition $5.

MISSOURI

Physicians Honored.—Three physicians who had completed fifty or more years in the practice of medicine were honored at a special meeting of the St. Louis County Medical Society, June 18. The physicians are Drs. Joseph A. Prichard, Overland, William H. Townsend, Maplewood, and John W. Pickel, Kirkwood. Each was presented with a key from the society as a token of appreciation, honor and esteem for many years' service in the profession. The guest speaker was Dr. John R. Paine, Minneapolis, and his subject "Recent Advances in the Study of Intestinal Obstruction."

Dr. Stewart Returns as State Health Commissioner.—Dr. James Stewart, formerly state health commissioner and for the past eight years in private practice in Jefferson City, has been again appointed to the position for a four year term, succeeding Dr. Harry F. Parker. Dr. Stewart was first named health commissioner in 1925. Prior to that he had been director of the hygiene division of the public school system in St. Louis. When his second term ended, in May 1933, Dr. Stewart returned to private practice. He was a member of the state legislature from 1905 to 1909 and served as secretary of the state board of health during his term as health commissioner.

NEBRASKA

State Medical Election.—Dr. Dexter D. King, York, was named president-elect of the Nebraska State Medical Association at the annual meeting in Lincoln in May and Dr. William P. Wherry, Omaha, was installed as president. Drs. Ted E. Riddell, Scottsbluff, and Harry W. Francis, Bancroft, were elected vice presidents. Dr. Roy B. Adams, Lincoln, continues as secretary. The 1942 meeting will be in Omaha.

NEW YORK

Society News.—Drs. William Libertson and William P. Van Wagenen, Rochester, addressed the Neuron Club at its spring meeting at the Rochester State Hospital, June 21, on "Metrazol Therapy" and "Prefrontal Lobotomy" respectively. The club, which has a membership of twenty-five psychiatrists in western New York and meets five times a year, was organized about twenty-five years ago.

School of Nutrition at Cornell.—The establishment of a school of nutrition with courses leading to the degree of master of science in nutrition was announced, June 27, by Cornell University, Ithaca. The school will offer a two year curriculum to students who have completed three years of preparatory work at the college level. In addition to training specialists the school will offer instruction to students in related fields, such as agricultural agents, conservationists, veterinarians, physiologists, toxicologists and those preparing to serve the food industries. Leonard A. Maynard, Ph.D., professor of animal nutrition at Cornell for the past twenty years and director of a nutrition laboratory established at Cornell by the U. S. Department of Agriculture in 1939, will be director of the school of nutrition. Members of the staff will be drawn from the divisions of the university most concerned with nutrition problems, it was said. Also associated with the work will be Dr. Eugene F. Du Bois, professor of physiology, and other members of the staff at Cornell University Medical College, New York, the announcement said.

New York City

Gifts to Columbia.—An anonymous donor has given $10,000 to Columbia University College of Physicians and Surgeons for research in dermatology by Dr. A. Benson Cannon. The Josiah Macy Jr. Foundation has also made a grant of $7,700, of which $2,200 is to be used for a study of the health needs of a group of families and $5,500 for a study of traumatic shock due to external injury or blow under the direction of Magnus I. Gregersen, Ph.D., professor of physiology.

Staff Changes at Rockefeller Institute.—Changes in the scientific staff of the Rockefeller Institute for Medical Research announced by the board of scientific directors include the following new appointments:

Member: Dr. Frank L. Horsfall Jr., New York.
Assistants: Drs. Frederick B. Bang, Nashville, Tenn.; Vincent P. Dole Jr., Boston; George H. Hogeboom, Baltimore, and Robert E. Shank, St. Louis.
Fellows: Drs. Robert A. Phillips and Sidney Rothbard, New York.

Promotions were announced as follows:

Associate member to member: Rene J. DuBos, Ph.D., and Dr. Rafael Lorente de Nó.
Assistant to associate: Lindsay M. Black, Ph.D., Dr. Jorge Casals-Ariet, Max A. Lauffer Jr., Ph.D., and David P. C. Lloyd, Ph.D.
Fellow to assistant: James A. Baker, Ph.D., Paul B. Hamilton and Margaret R. McDonald, Ph.D.
Dr. Robert F. Watson, New York, has been appointed resident physician at the hospital.

Personal.—Dr. Charles Ward G. Crampton received the Silver Buffalo of the Boy Scouts of America at the annual meeting of the National Council in Washington in May. Dr. Crampton has been an adviser of the scout organization on health matters for more than twenty-five years.——Dr. Jacob M. Gershberg, president and founder of the International Spanish Speaking Association of Physicians, was recently honored at a testimonial dinner at the Waldorf-Astoria.——Donald D. Van Slyke, Ph.D., member of the Rockefeller Institute for Medical Research, has been elected president of the American Bureau for Medical Aid to China.——Dr. Smith Ely Jelliffe has been made an honorary member of the section of neurology of the Royal Society of Medicine of England.——Dr. Karl Landsteiner, of the Rockefeller Institute for Medical Research, has been made a fellow of the Royal Society of England.

OHIO

State Medical Election.—Dr. Edward J. McCormick, Toledo, was named president-elect of the Ohio State Medical Association at the annual meeting in Cleveland, June 4, and Dr. Harry V. Paryzek, Cleveland, was installed as president. Next year's meeting will be held in Columbus.

Portrait of Dr. Sollmann.—Alumni and friends of Dr. Torald H. Sollmann, dean and professor of pharmacology and materia medica at Western Reserve University School of Medicine, Cleveland, presented a portrait of Dr. Sollmann to the school during commencement week. The names of the six hundred persons responsible for the gift were written in a leather bound book presented to Dr. Sollmann at an unveiling ceremony at the Hotel Cleveland. Dr. Sollmann is chairman of the Council on Pharmacy and Chemistry of the American Medical Association.

PENNSYLVANIA

District Meeting.—The annual meeting of the Eleventh Councilor District of the Medical Society of the State of Pennsylvania was held, July 10, at Johnstown. Drs. Dudley A. Irwin, Toronto, Ont., and Leo H. Criep, Pittsburgh, were the scientific speakers on "Silicosis" and "Management of Allergic Conditions of the Respiratory Tract" respectively. Drs. Francis F. Borzell, Philadelphia, president, and Lewis T. Buckman, Wilkes-Barre, president-elect of the Medical Society of the State of Pennsylvania, were guest speakers at the afternoon session.

Philadelphia

Portrait of Dr. Arnold.—The classes of 1940 and 1941 at Temple University School of Medicine presented to the school at the June commencement a life size portrait of Dr. Jesse O. Arnold, who recently became professor emeritus of obstetrics. These were the last two classes taught by Dr. Arnold. The portrait, painted by Lazar Raditz of New York and Philadelphia, was accepted by Dr. William N. Parkinson, dean of the school, and was placed in the library.

TENNESSEE

Poliomyelitis Outbreak.—Seventeen cases of poliomyelitis have been reported in Franklin and Coffee counties, according to a newspaper dispatch July 17. Camp Forrest, a new army cantonment, is in Coffee County. No cases have been reported there.

Society News.—Drs. Walter A. Ruch and W. Likely Simpson, Memphis, addressed the Benton, Carroll, Weakley and Henry Counties Medical Society, McKenzie, June 10, on "True versus False Labor" and "Osteomyelitis of the Skull Resulting from Infection of the Sinuses" respectively.——Dr. Augustus H. Lancaster, Knoxville, addressed the Knox County Medical Society, Knoxville, June 17, on congenital syphilis.

TEXAS

Special Society Elections.—At the recent annual meetings of special societies in Fort Worth the Texas Dermatological Society elected Drs. Arthur G. Schoch, Dallas, president; William F. Spiller, Galveston, vice president, and Duncan O. Poth, San Antonio, secretary, reelected. The Texas Neurological Society elected the following officers: Drs. James Greenwood Jr., Houston, president; Giles W. Day, Fort Worth, and John A. McIntosh, San Antonio, vice presidents, and Fred Terry Rogers, Dallas, secretary. Dr. Herbert T. Hayes, Houston, was elected president of the Texas Society of Gastro-Enterologists and Proctologists; Drs. Hugh Beaton, Fort Worth, and Dolph L. Curb, Galveston, were named vice presidents, and Dr. Thomas E. Smith, Dallas, was reelected secretary. The Texas Heart Association elected Drs. Charles T. Stone, Galveston, president; William B. Adamson, Abilene, vice president, and Victor E. Schulze, San Angelo, secretary, reelected. The Texas Orthopedic Association elected officers as follows: Drs. Edmund M. Cowart, Houston, president; Fred A. Bloom, Houston, vice president, and Mary Ruth Jackson, Dallas, secretary. Officers of the Texas Pediatric Society are Drs. Percy E. Luecke, Dallas, president; Frank H. Lancaster, Houston, president-elect, and John E. Ashby, Dallas, secretary.

WISCONSIN

Personal.—Dr. Rock Sleyster, Wauwatosa, received the honorary degree of doctor of laws from Marquette University, Milwaukee, at the commencement, June 11.——Dr. William Gordon Winter, formerly chief resident physician of Olive View Sanatorium, Olive View, Calif., has been appointed to the staff of the Wisconsin Anti-Tuberculosis Association in Milwaukee. He succeeds Dr. Florence E. MacInnis, who recently joined the Milwaukee health department.

Meeting of Eye and Ear Specialists.—The spring meeting of the Central Wisconsin Society of Ophthalmology and Otolaryngology was held recently at Wisconsin Rapids. The speakers were:

Dr. Henry L. Williams, Rochester, Minn., Sulfamido Compounds in Acute Otitis Media, Mastoiditis and Their Complications.
Dr. Avery D. Prangen, Rochester, Significance of Sturm's Interval in Refraction.
Dr. Hedwig A. Kuhn, Hammond, Ind., Allergy in Otolaryngology.
Dr. Ferdinand H. Haessler, Milwaukee, Diagnosis of Corneal Lesions.
Dr. Fred S. Cook, Eau Claire, Intraocular Foreign Bodies.
Dr. Fred Z. Havens, Rochester, Reconstructive Surgery of the Face.
Dr. Charles N. Spratt, Minneapolis, Disease of the Nasolacrimal Duct and Treatment.

Society News.—Dr. Edgar L. Gilcreest, San Francisco, addressed the Milwaukee Society of Clinical Surgery, June 11, on "Lesions of Muscles and Tendons in General But Particularly of the Shoulder Girdle and Arm." Dr. Gervase S. Flaherty, South Milwaukee, discussed "Gangrenous Appendicitis in Children."—Drs. Lawrence R. Boies and Charles E. Stanford, Minneapolis, addressed the Barron-Washburn-Sawyer-Burnett Counties Medical Society, June 10, in Cumberland on treatment of diseases of the eye, ear, nose and throat.—— Dr. Max J. Fox, Milwaukee, discussed poliomyelitis at a meeting of the Green Lake-Waushara County Medical Society, June 17, and Dr. William C. Keettel Jr., Madison, showed a film on "Forceps Delivery."—Dr. Ralph C. Matson, Portland, Ore., addressed the Racine County Medical Society at a special meeting, May 29, on "Thoracoscopy in the Diagnosis and Management of Tumors of the Lung and Chest Wall."

PUERTO RICO

Institute on Tuberculosis.—The Insular Department of Health of Puerto Rico in cooperation with the Department of Public Health of the School of Tropical Medicine, University of Puerto Rico, presented an institute on tuberculosis on three week ends, May 2-18, in Rio Piedras. Dr. James A. Doull, Cleveland, who is visiting the island at the invitation of the health department and the school of tropical medicine, gave a series of lectures on the epidemiology of tuberculosis, assisted by Morton Kramer, assistant professor of biostatistics in the school of tropical medicine. Others who gave lectures and demonstrations included Drs. Eduardo Garrido Morales, health commissioner of the island, Guillermo Ruiz-Cestero, José Rodriguez Pastor, Oscar G. Costa Mandry, Jacobo Simonet, Enrique Koppisch, Libertad R. Gaetan and Vera A. Joseph, all of San Juan; Jerome S. Peterson, Mayaguez; Felix M. Reyes and Juan Arruza, Bayamon; David E. Garcia, Eduardo D. Maldonado and Jacob Smith, Rio Piedras.

GENERAL

Society News.—Dr. Cameron St. C. Guild, director of the Negro program of the National Tuberculosis Association, New York, has been appointed executive secretary of the American Trudeau Society on a part time basis. He will continue his other work with the assistance of a field worker.

Meeting of Physical Therapists.—The twentieth annual conference of the American Physiotherapy Association was held at Lagunita Court, Stanford University, Calif., June 13-18. Speakers included Dr. Herman Chor, Chicago, who discussed "Psychology of the Invalid and the Handicapped" and "Skeletal Muscle and Motor Activity in Health and Disease." The association sponsored a graduate program in physical therapy at the Stanford University Medical School, San Francisco, June 23 to July 18.

Cancer Journal Suspends Publication.—The *American Journal of Cancer* has discontinued publication because of lack of funds. The journal was started ten years ago by the late Francis P. Garvan, president of the Chemical Foundation, and this foundation has made up deficits heretofore, it was said. The last issue, dated December 1940, was released July 14, funds for its publication having been contributed by friends. It was said that the journal had lost many European subscribers and had also suffered a shrinkage of funds because of the expiration of patents. Dr. Francis Carter Wood, New York, was the editor.

Watch for Kidnaper.—The special agent of the Federal Bureau of Investigation in Portland, Ore., has issued a notice to physicians and druggists identifying Clarence Vernon Stevens, who is believed to be under the care of physicians because of a heart ailment. Stevens was indicted in Kansas City, Mo., in 1933 as the kidnaper of Miss Mary McElroy of Kansas City. He is said to use digitalis and to breathe heavily. Any physician who obtains information about this man is asked to communicate directly with the special agent, J. D. Swenson, by telegraph or telephone collect. The telephone number is Broadway 0469, Portland.

Grants for Cancer Research.—The National Advisory Cancer Council at its quarterly meeting June 16 approved the following grants for research:

Memorial Hospital for the Treatment of Cancer and Allied Diseases, New York, $5,000 for study of metabolism in patients with cancer of the stomach.

University of Rochester School of Medicine and Dentistry, Rochester, N. Y., $5,000 for a coordinated study of cancer of the stomach in human beings.

New York Hospital, New York, $5,000 for research on early diagnosis.

Dr. Robert S. Stone, University of California Medical School, San Francisco, $9,750 for study of the curative value of fast neutrons on human cancer with the aid of the cyclotron.

Changes in Status of Licensure.—The Illinois State Department of Registration and Education announces the following action:

Dr. Edna Valeria Dale, Yakima, Wash., license revoked April 23 for conviction of Harrison Narcotic Act.

Dr. Harold Smith Partee, Chicago, license revoked April 23 for conviction of performing an abortion.

The Maine Board of Registration in Medicine reported the following action taken at a recent meeting:

Dr. Benjamin P. Hurd, Waterville, license revoked for his conviction of performing an illegal abortion.

Dr. Atherton M. Ross, Farmington, license restored with the restriction that he should not deal in narcotics, make use of them personally and should not receive a permit under the Harrison Narcotic Act.

Prize for Study of Gonococcic Infections.—The American Neisserian Medical Society announces an annual prize of $100, to be known as the P. S. Pelouze Prize and to be awarded to the person who in the opinion of an award committee has made the most important contribution to the control of gonococcic infections during the preceding year. Nominations for the award should be sent to the secretary not later than March 31 of each year, and the winner will be announced at the subsequent annual meeting of the society. Dr. Pelouze of Philadelphia is a member of the executive committee of the society. The secretary is Dr. Oscar F. Cox, 475 Commonwealth Avenue, Boston.

Insurance Physicians' Meeting.—The thirty-first annual meeting of the Medical Section of the American Life Convention was held at the Homestead, Hot Springs, Va., June 17-19. The speakers included Drs. William Boyd, Toronto, Ont., on "Genesis of Cancer"; Harry Goldblatt, Cleveland, "Hypertension"; James T. Bowman, London, Ont., "The Role of Clinical Judgment in Underwriting"; Ennion S. Williams, Richmond, Va., "Everyday Underwriting Practice with Respect to Colitis, Cardiospasm and Diverticulitis," and Cecil C. Birchard, Westmount, Que., "The Practical Value of Electrocardiograms in Selection." Dr. Wilton F. Blackford, Louisville, Ky., was elected chairman of the group, Dr. Thomas H. Dickson, St. Paul, vice chairman and Dr. Benjamin F. Byrd, Nashville, Tenn., secretary.

Society to Advance Psychoanalysis.—Announcement is made of the formation of the Association for the Advancement of Psychoanalysis by a group of psychiatrists in New York and several charter members from other cities. The training program will be carried on through the American Institute for Psychoanalysis, of which Dr. Karen Horney, New York, was elected dean. Lectures and seminars at New York Medical College by members of the association will be open to physicians and medical students. Other evening lectures and seminars at the New School for Social Research are open to lay persons interested in this field. Dr. William V. Silverberg, New York, is president of the new association; Dr. Clara M. Thompson, New York, vice president, and Dr. Harold Kelman, New York, secretary.

Appointments to Cancer Society Staff.—Dr. Samuel Binkley, assistant managing director of the American Society for the Control of Cancer in New York since June 1, 1940, has been appointed medical director. Dr. Binkley is a native of Oklahoma, a graduate of Harvard Medical School, Boston, and has been on the staff of Memorial Hospital for the Treatment of Cancer and Allied Diseases, New York, since 1936. Harold D. Fish, A.M., Evanston, Ill., has been appointed assistant managing director. Mr. Fish has been a teacher of biology and zoology and has been associated with the Carnegie Institution in the department of genetics, the Marine Biological Laboratory at Cold Spring Harbor, N. Y., and the Pittsburgh Skin and Cancer Foundation. Mr. A. Schaeffer Jr., formerly with the National Tuberculosis Association, has been appointed director of public relations.

Special Society Elections.—Dr. William C. Danforth, Evanston, Ill., was elected president of the American Gynecological Society at the annual meeting in Colorado Springs, May 26-28; Drs. Henricus J. Stander, New York, and Clarence B. Ingraham, Denver, were elected vice presidents, and Dr. Howard Taylor Jr., New York, was reelected secretary.—— Dr. Joseph V. Klauder, Philadelphia, was elected president of the American Dermatological Association at the annual meeting in New Orleans in April; Dr. Ralph Hopkins, New Orleans, vice president, and Dr. Harry R. Foerster, Milwaukee, continued as secretary.——Dr. William Edward Chamberlain, Philadelphia, was elected president of the American College of Radiology at the annual meeting in Cleveland in June; Dr. James J. Clark, Atlanta, Ga., vice president, and Mr. Mac F. Cahal, Chicago, executive secretary. The 1942 meeting will be held in Atlantic City during the week of the annual session of the American Medical Association.

CANADA

Personal.—Dr. Duncan Graham, head of the department of medicine, University of Toronto Faculty of Medicine, has been appointed a member of the Canadian National Research Council to succeed the late Sir Frederick Banting.

Vancouver Summer School.—The Vancouver Medical Association presented its annual summer school clinics, June 17-20, at the Hotel Vancouver in Vancouver, B. C. The speakers were:

Dr. Perrin H. Long, professor of preventive medicine and director of the department, Johns Hopkins University School of Medicine, Baltimore.

Dr. Robert M. Janes, senior demonstrator of surgery, University of Toronto Faculty of Medicine.

Dr. Edwin E. Osgood, associate professor and head of the division of experimental medicine, University of Oregon Medical School, Portland.

Dr. C. Frederic Fluhmann, associate professor of obstetrics and gynecology, Stanford University School of Medicine, San Francisco.

Dr. Robert R. Struthers, professor of pediatrics, McGill University Faculty of Medicine, Montreal.

LATIN AMERICA

Society News.—The Second National Brazilian Congress of Tuberculosis was held in São Paulo, May 10-16, and Porto Alegre, May 16-20. The official themes were "Early and Late Results of Artificial Pneumothorax in Brazil," "Laws Concerning the Tuberculous" and "Tuberculosis in Rural and Small Urban Centers of the Country."

FOREIGN

Rush Atabrine to Burma Road.—The American Red Cross announced on July 13 that a shipment of two hundred thousand tablets of atabrine which was on its way to Rangoon, Burma, by boat has been taken from the ship at Honolulu to be sent by clipper because of urgent need for the drug in the treatment of malaria along the Burma Road. The Red Cross is also buying ten million quinine tablets at Batavia, Java, to be sent to southern Yunnan Province. Other medical supplies with a total value of $1,000,000 are being purchased in this country and will be sent to unoccupied China through the Chinese Red Cross by the next available freighter.

Deaths in Other Countries

Sir William Henry Willcox, for many years lecturer on chemical pathology and forensic medicine at St. Mary's Hospital, London, died in London July 9.

Sir George Frederic Still, professor emeritus of diseases of children at King's College, London, and physician extraordinary to the king since 1937, died at Harnham Croft, Salisbury, recently, the New York *Times* reported July 1.

CORRECTION

Vitallium Skull Plates.—In the article by Dr. Fred W. Geib on "Vitallium Skull Plates" in THE JOURNAL, July 5, page 9, it was erroneously stated that vitallium is an alloy of cobalt, chromium and nickel. Vitallium is an alloy of cobalt, chromium and molybdenum and contains no nickel.

Government Services

CCC Enrollees Trained in First Aid

During the first ten months of the fiscal year ended June 30 a total of 108,776 enrollees completed the American Red Cross standard first aid course and received certificates. Last October the course was made compulsory for all enrollees. Ninety schools to train instructors were set up by the Red Cross and from July 1940 to the time of this report these schools had graduated 2,582 instructors, it was said.

Director of Nutrition Appointed

Mr. Milburn L. Wilson, director of extension service in the U. S. Department of Agriculture, Washington, D. C., has been appointed director of nutrition as an assistant to Paul V. McNutt, coordinator of health, welfare and related activities. He will be in charge of all government nutrition activities, will direct educational programs in the proper preparation of foods and will seek to enhance the nation's health by improving its diet, according to the New York *Times*.

Foreign Letters

LONDON

(From Our Regular Correspondent)

May 10, 1941 (delayed).

New Forms of Treatment in Otolaryngology

At a combined meeting of the Sections of Otology and Laryngology of the Royal Society of Medicine a discussion took place on chemotherapy, serotherapy and hemotherapy in diseases of the ear, nose and throat. Col. L. E. H. Whitby said that the principles for the use of sulfonamide derivatives were the same as in any other region—the infecting organism must be sensitive, the concentration of the drug must reach and maintain an effective level and the position in which action was required must be favorable. In acute otitis media the incidence of grave complications was reduced by chemotherapy, though this was also affected by other factors, such as epidemic influenza. Each case called for individual consideration as to whether surgery or chemotherapy or both should be used. Pus always required drainage; bony involvement responded badly to chemotherapy. Sulfonamide derivatives must be given boldly and in full doses. Inadequate dosage masked symptoms and failed to eradicate infection. Chronic aural suppuration responded less well, probably because of bony involvement. Nevertheless, secondary infection with Bacterium vulgare or Escherichia coli were sometimes controlled. The treatment of nasal sinusitis was generally disappointing unless begun early before pus formation was definite or bone was involved. Streptococcic tonsillitis and adenitis responded well. In scarlet fever complications appeared to be reduced by a combination of chemotherapy and serotherapy.

Dr. H. F. Brewer said that the success of chemotherapy had greatly diminished the use of specific serums. But chemotherapy was directed against bacteria and did not affect toxins directly. Specific serum was still the treatment for diphtheria; the bacillus was at present unresponsive to chemotherapy. As an adjuvant to chemotherapy it might be beneficial in acute infections (especially with complications and metastatic spread) by the pneumococcus, staphylococcus and Streptococcus pyogenes. The indications for hemotherapy were infrequent. For simple anemia stored blood, up to 15 days old, compared favorably with fresh blood, but for anemia dependent on sepsis or for a blood disease such as hemophilia or thrombopenia, fresh blood was preferable.

Mr. T. B. Layton said that in thrombosed sinuses sulfonamide derivatives were likely to cause difficulty in diagnosis by masking symptoms without touching the disease. If there was no organism in the clot, the clot was a physiologic reaction and best left alone. If there was an organism, it would produce no symptoms until breaking down allowed organisms to pass into the blood stream. Chemotherapy would then mask the only symptom which enabled one to decide on operation.

Mr. F. W. Watkin-Thomas agreed as to the danger of chemotherapy masking symptoms, especially in septic lateral sinus phlebitis. Sulfonamide derivatives might be administered in the earliest stages of acute otitis media, but once paracentesis became necessary they should be stopped, because if there was going to be any further spread it would be to the bone, which the sulfonamide derivatives would not reach. The same applied even more strongly to intracranial complications.

Mr. Terence Cawthorne spoke of the good results from chemotherapy in septic meningitis. He had 9 recoveries in 15 cases. He had treated 3 cases of osteomyelitis of the frontal bone following frontal sinus infection by chemotherapy with simple drainage with recovery in all. Before chemotherapy extensive operation would have been done and, in his experience, would have been disappointing and mutilating.

Altered Coroners' Procedures in Cases of War Deaths

Under ordinary circumstances a coroner's inquest must be held in every case of death from violence or suspected violence, even though the cause of death is quite clear. When it was known that our civil population would be attacked from the air, a large number of deaths were expected and it was decided that inquests would not be necessary in cases of death due to war operations. Regulations have now been made giving new powers to coroners, which will make it unnecessary to apply to the high court for leave to presume the death of persons whose bodies cannot be found (as occurs when persons are blown to pieces by bomb explosions) or who cannot be identified after air raids. By a new defense regulation a coroner may hold an inquiry when a registrar of deaths reports that he has reasonable cause to believe that death has occurred in consequence of war operations and that the body of the person has been destroyed, cannot be found, is in a position from which it cannot be recovered or that it has been buried as that of a person unknown, or as that of some other person. A notice of the coroner's intention to hold an inquiry will be posted in a public place, and inquiries will be held without a jury and, unless the home secretary otherwise directs, in private. When a death occurs in consequence of war operations and the body is identified no inquest is held, as would be necessary in all cases of death from violence in time of peace.

Country Branches of the London Hospitals

The damage to Guy's Hospital from air attacks is not large, but the surrounding property, which it owns, has suffered severely. The result is a drop by about $60,000 in the income from the rents. The evacuation of patients to safer areas has reduced to one hundred and eighty the beds for civilian sick, and two hundred beds are reserved for air raid casualties. Outpatient facilities are maintained. This month the hospital will open an annex in the country. To help in its equipment a gift of $10,000 has been received from the American people. If further raids should seriously handicap the hospital, everything is ready for an immediate switch to the country hospital. The forming of country branches of the great London hospitals may prove to be more than a war measure. It may be an experiment which marks the beginning of new development, to be continued in peace time. Its effect on patients and any advantages to teaching and research are being closely watched.

Roentgen Service in Spite of Bombs

In consequence of the frequent bombing of hospitals the British Red Cross has built a fleet of twenty-five mobile roentgen plants capable of the most urgent hospital work. When a hospital is hit, this often means the loss of radiographic equipment just when most needed. The units supplied by the Red Cross are entirely self contained, being able to generate their own power, and they can thus enable a hospital to carry on in spite of the loss of its own plant or supply of electricity. Each unit costs from $7,500 to $9,000. The units will be placed at strategic points throughout the country, ready to serve the various hospitals.

The Danger of Flying Glass in Air Raids

The amount of broken glass from windows shattered by the blast of high explosive bombs in this country must run into many thousands of tons. The flying glass is exceedingly dangerous, as it cuts like a knife. A wide range of material is now available for protection against flying glass and for use as a substitute for glass. At an exhibition held in London, not fewer than eighty substitutes for glass were shown. They are weatherproof and can be fixed to metal frames by a special composition. A linen reinforced acetate is now very popular. In hospitals the windows have been bricked up, but this has obvious disadvantages.

BUENOS AIRES

(From Our Regular Correspondent)

May 15, 1941.

Health Conditions in Argentina

According to the report of the national health department for 1939, further progress has been made in malaria control. The endemic phase showed a tendency to decline. The rather extensive rainfalls during the year were not favorable to the kind of malaria found in Argentina. Tertian malaria increased clinically; quartan and tropical decreased, especially the latter. Malignant tertian, dreaded throughout the world, is more benign in Argentina than benignant tertian itself, Dr. C. A. Alvarado, in charge of malaria control, pointed out. Anopheles pseudopunctipennis was active in the adult stage throughout the year covered by the report. In consequence, the annual epidemic not only lasted longer but had an earlier start in the warmest portions of the epidemic zone. Although several species of Anopheles are encountered in the endemic zone of Argentina, Anopheles pseudopunctipennis plays the most active role. This species is not a dangerous disease vector and is not to be compared with Anopheles gambiae. The national health department of Argentina does not possess hospital facilities for malarial patients. The cooperation of schools needs to be further stimulated. The educational results achieved by the campaign surpassed expectations. Budget restrictions have affected the fight against malaria. Attempts to discover a plant that would crowd out Algae spirogyrae, needed by the larva of Anopheles pseudopunctipennis, have proved unavailing. Malariologists differ in their view of the part irrigated rice fields play in the production of malaria. The conditions in different countries vary, and experiences gained in one cannot be applied elsewhere without investigation. Observations made in northern Argentina indicate that irrigated rice fields constitute a serious menace as breeding places. For this reason specific protective measures should be enforced, for example the requirement that dwelling places be constructed at a designated distance from the rice fields.

Five cases of bubonic plague occurred in 1939, 4 of them terminating fatally. The decrease in plague incidence in the last years is ascribed to increased health measures.

Trachoma is encountered especially in the northern provinces. There were only 5 cases of smallpox, 1 of which was fatal. In 1938 and 1937 there were respectively 53 and 80 cases. The source of infection must be sought in neighboring countries where smallpox is endemic. As the result of the extension of vaccination, Argentina is better protected against importation of the disease than formerly. Leprosy increased from an incidence of 3,500 to one of 3,900 cases. Four hundred and thirty-nine new cases were notified with 113 deaths. Two new leprosaries were erected. Another sanatorium is nearing completion. Only 538 persons, however, were institutionally cared for. Lepers living in Buenos Aires and vicinity are regularly inspected. Hookworm disease was actively combated, especially in the schools. About 47,000 persons were treated. The fact that latrines are not generally in use constitutes a source of infection.

Goiter is so largely disseminated in several northern provinces that in some schools a 100 per cent frequency is found among the children. The control is here carried out through physicians and teachers. Excellent results were obtained with iodine tablets. As many as 500,000 iodine tablets were distributed. No cases of intolerance were encountered. On the basis of the observations, tablets of 0.01 Gm. will be furnished hereafter instead of 0.005 Gm. previously used, even to small children. Adults are affected by these measures in relatively small numbers. It has therefore been proposed to distribute iodized salt in these districts without charge. Venereal infections are decreasing, if judged by the new cases reported. The education of the public continues by means of posters and a film

given the title "Blennorrhagia." The number of centers for maternity and infant welfare has grown in the interior of the country from twenty to twenty-nine. Their increased usefulness can be discerned from the fact that while 19,000 cases were given attention in 1938, some 50,000 were helped in 1939. Reexamination increased from 72,000 to 102,000. The distribution of articles of food, especially of milk cakes, has increased, though many difficulties need yet to be overcome. The number of pregnant women seeking advice grew from 5,000 to more than 10,000.

The control of narcotics, under the direction of Dr. R. A. Pita, has been extended. The organizational measures adopted and the results obtained have had a good effect on the control in the provinces, which are autonomous in medical legislation. Unification in the future of all laws pertaining to control of narcotics may result from it and thus facilitate general supervision. Buenos Aires is the only port for the legal importation of narcotic drugs. Several large provinces have already adopted the system of prescription receipts in use in the federal capital. The consumption of coca leaves is now under investigation to determine a plan of abolition of coca leaf mastication. The Bacteriologic Institute had an active year. The increased administrative work entailed by the manufacturing of drugs, which is part of the work of the institute, has greatly interfered with the scientific functions, which are its paramount functions, as its director, Dr. A. Sordelli, stressed. The stock of serums of all kinds was greatly increased. The smallpox vaccines manufactured by the institute for the past two years were much improved in quality. A new division for the rapid diagnosis of diphtheria was created. In six months it has carried out 3,500 analyses. The examination of 45,000 rats submitted by ships in ports of Argentina for plague control gave negative results and showed that overseas ports with which Argentina has agreements are free from plague. The Chemical Institute, a special division of the department of public health, also manufactures a larger number of drugs for current use.

NEWS FROM GERMANY

(Compiled from recent German periodicals)

Nursing Experience Required of Medical Students

According to a decree of April 3 issued by the ministry of the interior, medical students for whom the nursing training had been reduced will be required to serve the six months in active nursing or its accepted equivalent. The provisions of the law now apply in full also to male students preparing for medicine who were deemed unfit for active military duties and to female medical students. Those who already served three months and planned to begin their medical training with the summer semester of 1941 were permitted to postpone the remaining three months. Compliance with the full requirement is a prerequisite for admission to the medical examinations at the close of the summer half year of 1941. Until further notice, as much as three months' service in a nonclinical medical institute will be accepted as fulfilling half of the requirement (*Deutsche med. Wchnschr.* **67**:522 [May 9] 1941).

Industrial and Traffic Accidents

In Germany, 16,400 persons lose their lives each year from accidents incurred either in traffic or in industry. About 270,000 traffic accidents occur annually, in which 7,400 persons are killed and 180,000 injured (*Deutsches Aerzteblatt* **71**:175 [April 12] 1941). Accidental injuries among children between the ages of 1 and 15 years, mostly incurred on the streets or at play, cause about 4,800 deaths. Children by the tens of thousands, however, suffer permanent damage. Of industrial accidents, including minor occurrences, 1,800,000 are reported annually. These result in 9,000 deaths; 85,000 persons are partially incapacitated for work, 2,000 permanently. A considerable proportion of those industrially injured recover the ability to work only to a limited extent. No statistics are kept for accidents in the home resulting in injury or death. They are computed, however, to be as high as those which occur in industry.

Roentgen Ray Examination of Polish Workers

According to a government decree, Polish civilians of either sex, admitted as laborers into Germany, will be roentgenologically examined for tuberculosis at designated ports of entry. The date of the examination is recorded on the worker's card and officially stamped. The results of the examination are not entered. The provisions of this decree have general application with the exception of certain sections on the eastern border. Regulations covering the roentgen ray examination of Polish workers already in Germany are in preparation (*Deutsche med. Wchnschr.* **67**:522 [May 9] 1941).

Nazification of the University of Strasbourg

The formal opening of the former seat of French learning, after the pattern heralded by the Germans and recently reported in these columns (THE JOURNAL, May 31, p. 2522), is set for the beginning of the winter semester 1941-1942. The organization of the academic staff, determined by the head of the civil government with the approval of the national ministry of education, is now under way. Two appointments have already been announced: Prof. Friedrich Klinge, pathologic anatomist of the University of Münster, and Prof. Ernst Rodenwaldt, hygienist of the University of Heidelberg (*Klin. Wchnschr.* **20**:408 [April 19] 1941).

Blood Test Restrictions

More than a year ago the German government established and promulgated the principles to be followed in organizing the blood donor service. The determination of the M and N characteristics of the blood is now prohibited until further notice. Moreover, governmentally approved testing serums may no longer be used except for the preparation of medicolegal opinions requested by the state (*Klin. Wchnschr.* **20**:408 [April 19] 1941).

New Rumanian University

Owing to the cession of Klausenburg to Hungary, the Rumanian University will be transferred to Karlsburg (Alba Julia). The buildings are now in process of construction. Several of the faculties, including the faculty of medicine, are temporarily housed in Hermannstadt (*Klin. Wchnschr.* **20**:408 [April 19] 1941).

Belgian Universities

The Belgian universities of Brussels, Liége, Ghent and Louvain are reported to have been reopened in November 1940 (*Klin. Wchnschr.* **20**:408 [April 19] 1941).

Marriages

THOMAS E. KANE, Boone, Iowa, to Miss Dorothy Maxine Ekstrom of North Platte, Neb., April 2.

HARRY L. WALKER, Cedar Rapids, Iowa, to Miss Inez McCall of Tipton in Rochester, Minn., April 14.

CHARLES CLARKE SMELTZER to Miss Helen Pauline Brown, both of Knoxville, Tenn., May 15.

ROBERT Y. NETOLICKY, Cedar Rapids, Iowa, to Emilie Griffin of Marion at Nashua, May 24.

JOSEPH HANDLEY ROGERS to Miss Catherine Gail Shannon, both of Gadsden, Ala., May 4.

MILTON F. KIESAU, Postville, Iowa, to Miss Pauline Smith of Wapello, June 8.

LUTHER C. HICKERSON, Brooklyn, Iowa, to Miss Ruth Adair of Indianola, June 18.

Deaths

Meyer Bodansky ✠ Galveston, Texas; University of Chicago, The School of Medicine, 1935; instructor of biological chemistry from 1919 to 1923, adjunct professor from 1923 to 1925 and associate professor from 1926 to 1930 and since 1930 professor of pathological chemistry at the University of Texas School of Medicine, which is now known as the University of Texas Medical Branch; visiting professor of physiological chemistry at the American University of Beirut, Syria, 1932-1933; member of the American Society of Clinical Pathologists; served in the ordnance department of the United States Army and later in the laboratory division of the medical corps, 1918-1919; director of the John Sealy Memorial Research Laboratory, John Sealy Hospital; author of "Introduction to Physiological Chemistry"; co-author of "Laboratory Manual of Physiological Chemistry" and "Biochemistry of Disease"; on the advisory editorial board of the *American Journal of Clinical Pathology*; aged 44; died, June 14, of bronchopneumonia following bilateral mastoiditis.

Thomas David Jones ✠ Richmond, Va.; Medical College of Virginia, Richmond, 1906; assistant demonstrator of obstetrics from 1908 to 1911, assistant demonstrator of anatomy from 1909 to 1910, demonstrator of obstetrics from 1911 to 1913, adjunct professor of principles of surgery from 1911 to 1912, associate in pediatrics from 1924 to 1937 and since 1937 assistant professor of pediatrics at his alma mater; member of the American Academy of Pediatrics; past president of the Richmond Academy of Medicine; on the staffs of the Retreat for the Sick Hospital, Sheltering Arms Hospital, Dooley Hospital, St. Philip Hospital and the Memorial Hospital; aged 62; died, June 10.

Charles August Stammel ✠ Lieut. Colonel, Medical Corps, United States Army, Fort Lewis, Wash.; Medical Department of the University of Cincinnati, 1910; entered the medical corps of the United States Army as a first lieutenant in 1918; served during the World War; rose through the various grades to that of lieutenant colonel in 1937; member of the Radiological Society of North America and the American College of Radiology; aged 55; died, May 25, of coronary occlusion.

Thomas Ash Claytor ✠ Washington, D. C.; University of Pennsylvania Department of Medicine, Philadelphia, 1891; formerly clinical professor of medicine at the George Washington University School of Medicine; member of the American Clinical and Climatological Association; veteran of the Spanish-American and World wars; aged 71; died, June 4, in the Garfield Hospital of pneumonia.

Max Rosecrans Charlton ✠ Tillamook, Ore.; State University of Iowa College of Medicine, Iowa City, 1906; at one time passed assistant surgeon in the United States Public Health Service reserve; served during the World War; fellow of the American College of Surgeons; aged 59; medical superintendent of the Charlton Hospital, where he died, May 31, of carcinoma of the liver.

Olin George Andrews Barker ✠ Johnstown, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1898; member of the American Academy of Ophthalmology and Otolaryngology; past president of the Cambria County Medical Society; for many years on the staffs of the Mercy Hospital and the Conemaugh Valley Memorial Hospital; aged 69; died, May 28.

John Reed Brosheer, Middlesboro, Ky.; University of Louisville School of Medicine, 1937; member of the Kentucky State Medical Association; first lieutenant in the medical reserve corps of the United States Army; on the staff of the Middlesboro Hospital; aged 28; was killed, June 8, near Banning, Calif., in an airplane accident while on an army training flight.

Robert Irvine Bryson, Augusta, Ga.; University of Georgia Medical Department, Augusta, 1909; member of the Medical Association of Georgia; for many years clinical assistant and instructor in clinical dermatology and oncology at his alma mater; on the staff of the University Hospital; aged 55; died, June 4, of coronary thrombosis and chronic cholecystitis.

Otho James Powell, Ashland, Ohio; Western Reserve University Medical Department, Cleveland, 1898; member of the Ohio State Medical Association; past president of the Ashland County Medical Society; formerly member of the city board of education; at one time on the staff of the Samaritan Hospital; aged 70; died, May 24, of coronary occlusion.

Henry Michael McDonald ✠ Surgeon Lieutenant Commander, United States Navy, retired, Los Angeles; University of California Medical Department, San Francisco, 1912; entered the navy May 12, 1915 and retired Nov. 15, 1928 for incapacity resulting from an incident of service; aged 53; died, June 13, of coronary angiospasm due to chronic nephritis.

Walter R. Cleveland ✠ Evansville, Ind.; Indiana Medical College, School of Medicine of Purdue University, Indianapolis, 1906; member of the Radiological Society of North America, American College of Radiology and the American Radium Society; aged 56; on the staff of St. Mary's Hospital, where he died, June 10, of chronic cholelithiasis.

John Wesley Gorder, Greybull, Wyo.; Sioux City (Iowa) College of Medicine, 1903; member of the Wyoming State Medical Society; past president and secretary of the Northwestern Counties Medical Society; county health officer; on the staff of St. Luke's Hospital; aged 64; died, June 6, in a hospital at Billings of pneumonia.

Bernard Barrett Gilman, Boston; Harvard Medical School, Boston, 1929; member of the Massachusetts Medical Society; assistant director of the division of communicable diseases, Massachusetts Department of Public Health; aged 37; died, May 31, in the Baker Memorial Hospital of mesenteric embolism and rheumatic heart disease.

Albert T. Davis ✠ Marion, Ind.; Medical College of Indiana, Indianapolis, 1904; past president of the Grant County Medical Society; served during the World War; on the staff of the Marion General Hospital; consultant in surgery, Veterans Administration Facility; aged 64; died, June 10, in Rochester, Minn., of glioma of the brain.

Douglas Culpepper McBride ✠ Alexandria, La.; Tulane University of Louisiana School of Medicine, New Orleans, 1918; member of the Southeastern Surgical Congress; fellow of the American College of Surgeons; on the staff of the Baptist Hospital; aged 48; died, June 12, in Memphis, Tenn., of cerebral hemorrhage.

Eldon Phillips, Cape Girardeau, Mo.; Missouri Medical College, St. Louis, 1883; member of the Missouri State Medical Association; at one time health officer of Stoddard County; formerly member of the board of education of Bloomfield; aged 90; died, May 21, in the Shorewood (Wis.) Hospital of chronic myocarditis.

Robert Everett Moss, La Grange, Texas; Jefferson Medical College of Philadelphia, 1883; member of the state Medical Association of Texas, American Laryngological, Rhinological and Otological Society and the American Ophthalmological Society; fellow of the American College of Surgeons; aged 83; died in May.

Ora L. Pelton ✠ Elgin, Ill.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1872; Bellevue Hospital Medical College, New York, 1874; fellow of the American College of Surgeons; surgeon, St. Joseph's and Sherman hospitals; aged 89; died, May 26, of uremia and nephritis.

William Stoddard Van Dalsem, San Jose, Calif.; Chicago Homeopathic Medical College, 1897; member of the California Medical Association; for many years member of the board of education; aged 68; died, April 18, in San Francisco of pneumonia following encephalitis and Parkinsonian syndrome.

Julien Harmon Wilson, Columbus, Ohio; Ohio State University College of Medicine, Columbus, 1922; member of the Ohio State Medical Association; on the staffs of St. Francis Hospital and the White Cross Hospital; aged 49; died, May 25, of injuries received in an automobile accident.

James Richard Clements, Pelham, Ga.; Atlanta College of Physicians and Surgeons, 1901; member of the Medical Association of Georgia; formerly mayor and member of the city council; for many years member of the board of education; aged 67; died, May 24, of myocarditis.

Sherman S. Frazier ✠ Angola, Ind.; Fort Wayne College of Medicine, 1891; secretary of the Steuben County Medical Society; secretary of the city board of health; city health officer; aged 76; on the staff of the Cameron Hospital, where he died, June 10, of carcinomatosis.

Rocco De Rosa, Chicago; Chicago College of Medicine and Surgery, 1913; fellow of the American College of Surgeons; on the staffs of the Mother Cabrini Memorial Hospital, Chicago, and the Cook County Infirmary, Oak Forest; aged 52; died, June 8, of coronary thrombosis.

Laddie Walter Zeman, Hinsdale, Ill.; University of Illinois College of Medicine, Chicago, 1940; first lieutenant in the medical reserve corps of the United States Army; aged 27; was drowned, June 13, in a lagoon at San Juan, Puerto Rico, when the boat he was sailing capsized.

Samuel Seabury Graves, Chicago; Reliance Medical College, Chicago, 1909; formerly medical director of the Industrial Commission of Illinois and chairman of the medical committee of the International Association of Industrial Accident Boards; aged 71; was found dead, June 10.

Franklin McCue Hanger, Staunton, Va.; University of Virginia Department of Medicine, Charlottesville, 1883; member of the Medical Society of Virginia; past president of the Virginia Society of Ophthalmology and Otolaryngology; aged 79; died, June 17.

Herman Arthur Ehrmann, New York; College of Physicians and Surgeons, medical department of Columbia College, New York, 1886; aged 76; consultant in otolaryngology, Lenox Hill Hospital, where he died, June 2, of coronary thrombosis.

Walter Clarence Sherwood, Mitchell, Ind.; Vanderbilt University School of Medicine, Nashville, Tenn., 1901; member of the Indiana State Medical Association; formerly health officer; aged 64; died, May 29, of fracture of the right femur.

John R. May, Little Rock, Ark.; University of Arkansas School of Medicine, Little Rock, 1908; member of the Arkansas Medical Society; formerly superintendent of the Pulaski County Hospital; aged 57; died in June of a self-inflicted bullet wound.

Julius Trousdale Conditt, Hagerman, N. M.; University of Nashville (Tenn.) Medical Department, 1908; member of the New Mexico Medical Society; aged 59; died, May 25, in the Methodist Hospital, Albuquerque, of pulmonary tuberculosis.

John Chester Fleming ✠ Elkhart, Ind.; Northwestern University Medical School, Chicago, 1895; fellow of the American College of Surgeons; on the staff of the Elkhart General Hospital; aged 67; died, June 8, of cerebral hemorrhage.

Joseph G. Stulb, New Orleans; Medical Department of Tulane University of Louisiana, New Orleans, 1902; member of the Louisiana State Medical Society; aged 68; died, May 23, in the Touro Infirmary of carcinoma of the bladder.

Otho Perry Campbell, White Stone, Va.; Medical College of Virginia, Richmond, 1937; first lieutenant in the medical reserve corps of the United States Army; aged 28; died, June 2, in Richmond of pulmonary edema following pneumonia.

Fred Gerald Poutre ✠ Horton, Kan.; University of Kansas School of Medicine, Kansas City, 1910; served during the World War; aged 53; died, May 9, in the Veterans Administration Facility, Wadsworth, of coronary thrombosis.

Alfred B. Grosse ✠ San Mateo, Calif.; Cooper Medical College, San Francisco, 1894; member of the American Urological Association; aged 67; died, May 29, in the Mount Zion Hospital, San Francisco, of abdominal carcinomatosis.

Peter Cope White ✠ Tulsa, Okla.; Jefferson Medical College of Philadelphia, 1911; aged 51; on the staffs of St. John's Hospital and the Hillcrest Hospital, where he died, May 26, of peritonitis following a ruptured appendix.

Herbert Carey Walker ✠ Huntsville, Ala.; Vanderbilt University School of Medicine, Nashville, Tenn., 1927; past president of the Madison County Medical Society; served during the World War; aged 43; died, May 29.

Ora Richard Saul, Dana, Ill.; Chicago College of Medicine and Surgery, 1914; member of the Illinois State Medical Society; served during the World War; aged 50; died, May 29, of injuries received in an automobile accident.

Ludwig Cochran Heintz, Covington, La.; Medical Department of Tulane University of Louisiana, New Orleans, 1906; formerly parish coroner; aged 55; died, May 24, in the Baptist Hospital, New Orleans, of bronchopneumonia.

Walter S. Gilmer, Henlawson, W. Va.; University College of Medicine, Richmond, 1910; member of the West Virginia State Medical Association; aged 56; died, June 8, in a hospital at Roanoke, Va., of pneumonia.

Lorin Farr Rich ✠ Rexburg, Idaho; Chattanooga (Tenn.) Medical College, 1901; Jefferson Medical College of Philadelphia, 1906; served during the World War; aged 60; died, May 14, of chronic interstitial nephritis.

John Prothero Laughlin, Pittsburgh; University of Pennsylvania Department of Medicine, Philadelphia, 1897; member of the Medical Society of the State of Pennsylvania; aged 69; died, May 23, of cerebral hemorrhage.

Clyde Livingstone Smith ✠ Maywood, Calif.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1902; served during the World War; aged 62; died, May 17, of septicemia.

Charles Edward Hablutzel, San Jose, Calif.; Cooper Medical College, San Francisco, 1895; member of the California Medical Association; served during the World War; aged 76; died, May 31, of Parkinson's disease.

Albert Louis Wilsford, Moro, Ark.; University of Tennessee Medical Department, Nashville, 1888; for many years member of the school board; formerly member of the state legislature; aged 72; died, May 17.

William Brigham Parkinson ✠ Fairfield, Idaho; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1903; aged 63; died in May in Twin Falls of coronary embolism.

Ira Chestnut Young, El Paso, Texas; University of Louisville (Ky.) Medical Department, 1892; Illinois Medical College, Chicago, 1904; also a lawyer and a minister; aged 69; died, May 27, of cerebral hemorrhage.

William A. Beason, Ashville, Ala.; College of Physicians and Surgeons, Baltimore, 1893; member of the Medical Association of the State of Alabama; bank president; aged 73; died, May 23, of cerebral hemorrhage.

Whittlesey Du Bois Lester, Schenectady, N. Y.; Albany Medical College, 1899; member of the Medical Society of the State of New York; aged 66; died, June 9, in the Ellis Hospital of cerebral hemorrhage.

Herbert J. Patterson, Portland, Maine; College of Physicians and Surgeons, Baltimore, 1885; member of the Maine Medical Association; aged 79; died, May 13, of carcinoma of the pancreas and biliary calculi.

Van Ingersoll Allen, Creston, Ohio; Eclectic Medical Institute, Cincinnati, 1907; member of the Ohio State Medical Association; aged 57; died, May 30, in the Municipal Hospital, Tampa, Fla., of pneumonia.

Joseph Frame, Rockland, Mass.; Harvard Medical School, Boston, 1894; member of the Massachusetts Medical Society; for many years member of the board of health; aged 74; died, May 23, of arteriosclerosis.

Hermas Deslauriers, Montreal, Que., Canada; M.B., School of Medicine and Surgery of Montreal, Faculty of Medicine of the University of Laval at Montreal, 1904, and M.D., 1905; aged 61; died, May 28.

Harry Lawton Dougherty, Boston; University of Louisville (Ky.) School of Medicine, 1925; member of the Massachusetts Medical Society; on the staff of the Faulkner Hospital; aged 42; died, June 1.

Robert William Maclellan, Halifax, N. S., Canada; Dalhousie University Faculty of Medicine, Halifax, 1938; captain in the Reserve Canadian Army Medical Corps; aged 26; died, May 6, of pneumonia.

Charles Wilson Goodwin, Staten Island, N. Y.; Harvard Medical School, Boston, 1906; aged 72; formerly superintendent of the Staten Island Hospital, where he died, June 3, of cardiorenal disease.

Richard Henry Wessels, Mancelona, Mich.; St. Louis College of Physicians and Surgeons, 1900; member of the Michigan State Medical Society; aged 72; died, May 24, of cerebral hemorrhage.

John Turner Bynum Jr. ✠ Big Spring, Texas; University of Texas School of Medicine, Galveston, 1927; on the staff of the Big Spring State Hospital; aged 38; died, May 23, of gastric hemorrhage.

John H. Bannister, Charleston, W. Va.; College of Physicians and Surgeons, Baltimore, 1912; aged 54; died, June 2, of bronchopneumonia and trauma to the chest following an automobile accident.

Gean Dutton Cleaver, Los Angeles; John A. Creighton Medical College, Omaha, 1909; served during the World War; aged 56; died, May 26, in the Veterans Administration Facility, West Los Angeles.

William Alexander Moore, Tacoma, Wash.; McGill University Faculty of Medicine, Montreal, Que., Canada, 1914; member of the Washington State Medical Association; aged 63; died in May.

Bernard Kohn ✠ Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1899; aged 65; served in various capacities on the staff of the Jewish Hospital, where he died, May 21.

Thomas E. Walton ✠ Danville, Ill.; Kentucky School of Medicine, Louisville, 1889; aged 80; on the emeritus staff of St. Elizabeth Hospital and the Lakeview Hospital, where he died, May 29.

John H. Seaman, New Haven, Mich.; Michigan College of Medicine and Surgery, Detroit, 1891; member of the Michigan State Medical Society; aged 75; died, May 27, of cerebral hemorrhage.

John **D. Westrick,** Defiance, Ohio; Toledo Medical College, 1888; member of the Ohio State Medical Association; formerly city health officer; aged 79; died, May 24, of chronic myocarditis.

Mary **Babcock Atwater,** Berkeley, Calif.; Woman's Medical College, Chicago, 1887; aged 82; died, June 1, in the Alta Bates Hospital of carcinoma of the gallbladder with metastases to the liver.

Charles Joseph Schmelz, Guerneville, Calif.; University of California Medical Department, San Francisco, 1895; member of the California Medical Association; aged 76; died, May 31.

William Saunderson Yeager ✠ Georgiana, Fla.; Medical College of Ohio, Cincinnati, 1908; member of the Ohio State Medical Association; aged 53; died, May 25, of valvular heart disease.

Frederic D. Falby, Huntington, Vt.; University of Vermont College of Medicine, Burlington, 1888; formerly member of the state legislature; at one time school director; aged 74; died, June 1.

Harry Scott Monroe, New Florence, Pa.; Eclectic Medical College, Cincinnati, 1911; on the staff of the Veterans Administration Facility; aged 54; died, May 28, of burns received in a fire.

Martin Gould Marden, Newark, N. J.; University of Louisville (Ky.) Medical Department, 1902; veteran of the Spanish-American and World wars; aged 65; died, June 19.

William Thomas Bruner, Louisville, Ky.; Hospital College of Medicine, Louisville, 1896; aged 70; died, June 3, in the Kentucky Baptist Hospital following an appendectomy.

Albert Newell Benedict, Yonkers, N. Y.; Cornell University Medical College, New York, 1905; served during the World War; aged 59; died, June 3, of coronary occlusion.

Peter J. Haigis, Foxboro, Mass.; Boston University School of Medicine, 1904; member of the Massachusetts Medical Society; aged 67; died, June 2, of carcinomatosis.

William H. Heisen, El Paso, Texas; Julius-Maximilians-Universität Medizinische Fakultät, Würzburg, Bavaria, Germany, 1889; aged 78; died, May 13, of coronary occlusion.

Clara M. Luther, Minneapolis; Minneapolis College of Physicians and Surgeons, 1901; aged 82; died, May 8, in the Franklin Hospital of cerebral thrombosis and hemiplegia.

Charles E. Coffin, Winter Park, Fla.; Omaha Medical College, 1889; at one time mayor of Winter Park; aged 76; died, June 9, in the Orange General Hospital, Orlando.

Charles R. Applegate, New Castle, Ind.; Kentucky School of Medicine, Louisville, 1901; served during the World War; aged 69; died, June 8, in the Henry County Hospital.

Roley T. Akers, Alum Ridge, Va. (licensed in Virginia by years of practice); also a minister; member of the county school board; aged 83; died, June 16, of myocarditis.

Amelia Viola Zimmerman, Baltimore; Southern Homeopathic Medical College, Baltimore, 1895; aged 69; died, May 27, of arteriosclerosis, hypertension and myocarditis.

Elwood Wand, Woodbury, Ky.; Vanderbilt University School of Medicine, Nashville, Tenn., 1886; aged 84; died, May 13, of arteriosclerosis, hypertension and myocarditis.

William Burton Collier, Littleton, Colo.; Medico-Chirurgical College of Philadelphia, 1900; formerly owner of a hospital bearing his name; aged 70; died, May 12.

Henry A. Whillans, Zeballos, B. C., Canada; McGill University Faculty of Medicine, Montreal, Que., 1899; served during the World War; aged 69; died, April 20.

Pleasant Henry Askew Jr. ✠ Nashville, Ga.; University of Georgia School of Medicine, Augusta, 1934; aged 31; was killed, May 29, in an automobile accident.

I. E. Stennis, McComb, Miss.; Louisville (Ky.) Medical College, 1893; member of the Mississippi State Medical Association; aged 75; died, May 9, of myocarditis.

Lee Henry Curran, Tacoma, Wash.; Starling-Ohio Medical College, Columbus, 1913; formerly connected with the U. S. Indian Service; aged 52; died, April 27.

Walter Frederick Noyes ✠ Colebrook, N. H.; University of Vermont College of Medicine, Burlington, 1908; aged 55; died in May of a self-inflicted bullet wound.

James Hiram Hasty, Atlanta, Ga.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1908; aged 60; died, June 6, of arteriosclerosis and heart disease.

Robert Barnabas Keane, Bridgeport, Conn.; University and Bellevue Hospital Medical College, New York, 1903; aged 65; died, May 23, in St. Vincent's Hospital.

Neil Clayton Matzek, Belmont, Mass.; Tufts College Medical School, Boston, 1921; member of the Massachusetts Medical Society; aged 44; died, May 14.

William Franklin Watkins, Maywood, Ky.; Hospital College of Medicine, Louisville, 1889; aged 87; died, May 31, of epithelioma of the face and neck.

James Finley Hanna, Adena, Ohio; Medical College of Ohio, Cincinnati, 1895; aged 74; died, May 29, in Martins Ferry of carcinoma of the bladder.

John Leonard George, Tillamook, Ore.; Willamette University Medical Department, Salem, 1907; aged 68; died, May 16, of coronary occlusion.

Virginia Dinsmore, Griggsville, Ill.; Woman's Medical College, Chicago, 1889; aged 87; died, May 26, in Pittsfield, of acute dilatation of the heart.

George C. Wallace, Rock Rapids, Iowa; College of Physicians and Surgeons, Keokuk, 1877; aged 90; died, May 22, of cirrhosis of the liver.

Joseph E. Wharton, Peoria, Ill.; Drake University Medical Department, Des Moines, Iowa, 1898; aged 67; died, May 10, of coronary thrombosis.

Ledford A. Williams, Abbeville, Ga.; Atlanta Medical College, 1894; member of the Medical Association of Georgia; aged 75; died, May 13.

William Connolly, Cresco, Iowa; Rush Medical College, Chicago, 1883; aged 80; died, May 15, of edema of the lungs and cardiorenal disease.

William R. Kellam, Perryville, Texas (licensed in Texas under the Act of 1907); aged 84; died, May 12, of carcinoma of the urinary bladder.

Arthur Bascom Hardin, McCook, Neb.; Keokuk (Iowa) Medical College, 1896; Barnes Medical College, St. Louis, 1897; aged 76; died, May 14.

William Hazen Embree, Stellarton, N. S., Canada; Dalhousie University Faculty of Medicine, Halifax, 1938; aged 31; died in May.

Charles Franklin Benson, Winnipeg, Man., Canada; University of Manitoba Faculty of Medicine, Winnipeg, 1936; aged 32; died, June 3.

Frank S. Gray, Allendale, Ill.; Medical College of Ohio, Cincinnati, 1883; aged 86; died, May 26, of myocarditis and arteriosclerosis.

Joel C. Freemon, Argenta, Ill.; Hahnemann Medical College and Hospital, Chicago, 1903; aged 60; died, May 27, of heart disease.

Abe Maurice Hilkowich, New York; Cornell University Medical College, New York, 1904; aged 64; died, June 7, of heart disease.

Glenn Edward Prime, Neotsu, Ore.; University of Oregon Medical School, Portland, 1915; aged 53; died, April 20, of heart disease.

James Moffat Forster, Oakville, Ont., Canada; Victoria University Medical Department, Coburg, 1886; aged 76; died, May 30.

Albert Thomas Macnamara, Toronto, Ont., Canada; University of Toronto Faculty of Medicine, 1897; aged 76; died, May 25.

John Ross Russell, Arthur, Ont., Canada; University of Western Ontario Medical School, London, 1928; aged 37; died, May 20.

John Angier MacGregor, West Frankfort, Ill.; Barnes Medical College, St. Louis, 1898; aged 67; died, May 14, in Chicago.

Frederick Judson Bell, Toronto, Ont., Canada; University of Toronto Faculty of Medicine, 1919; aged 46; died, June 3.

George Hardy Clark, Long Beach, Calif.; Hahnemann Medical College and Hospital, Chicago, 1882; aged 81; died in May.

Emma J. Warren, Chicago; Northwestern University Woman's Medical School, Chicago, 1893; aged 77; died, May 21.

Richmond E. Gibson, Flournoy, Calif.; University of Buffalo School of Medicine, 1890; aged 86; died, May 28.

John Olson, St. Louis; Barnes Medical College, St. Louis, 1906; aged 71; died, May 22, of coronary occlusion.

Bureau of Investigation

CEASE AND DESIST ORDERS

Abstracts of Certain Federal Trade Commission Releases

The work of the Federal Trade Commission, in helping to protect the public against misrepresentation or fraud in the medical as well as other fields, has been greatly extended by the provisions of the Wheeler-Lea Amendment to the Federal Trade Commission Act. The Food, Drug and Cosmetic Act of 1938 added to the Food and Drug Administration's control of the advertising claims and statements made on the labels of medicines or on the carton or in the accompanying leaflet, whereas what might be termed collateral advertising, that which appears in newspapers and magazines and over the air, comes more actively under the purview of the Federal Trade Commission, by virtue of the Wheeler-Lea Amendment.

THE JOURNAL has at various times commented on the activities of the Federal Trade Commission in this connection, even before the Wheeler-Lea Amendment gave it its added rights. In some cases the Commission may accept from the person or concern involved a stipulation that the objectionable practices or claims cited will be discontinued. In other cases the Commission issues what is known as a Cease and Desist Order, in which the individual, manufacturer or distributor cited is ordered to cease and desist from practices which have been declared objectionable.

Abstracts of some of the orders issued during 1940 follow:

Le Flor Weight Reduction Tablets.—These were sold also under the name of "Le Flor Method" by one Leland F. Benham, trading as the Le Flor Company, Chicago, and still earlier as Dixie Products Company. They were found to have no therapeutic value beyond that of a cathartic or a laxative, as they consisted of dextrose, phenolphthalein, powdered extract of bladderwrack and talc. On May 4, 1940, the Federal Trade Commission ordered the Le Flor concern to cease advertising that their product was a cure or remedy for obesity and did not contain any dehydrating drugs, whereas the phenolphthalein is a dehydrating drug.

Marrow Cosmetic Products.—The J. W. Marrow Manufacturing Company of Chicago was ordered by the Federal Trade Commission on April 7, 1940, to cease and desist from representing that its preparations will nourish the skin or prevent, remove or correct lines or wrinkles; that "Marrow Acne Cream" will correct or remove blemishes, pimples or enlarged pores, or that it has antiseptic properties; that "Mar-O-Oil" will revitalize dead hair or correct the cause of excessive oiliness of the hair, and that "Trimal" contains oil or has any effect on live cuticle or on the growth of finger nails. The order also prohibited false representation of the extent to which those who professionally treat the hair or skin have adopted and used the company's preparations, and the extent to which scientists or other experts who supervise and direct makeup in motion picture studios recommend or specify the use of the concern's cosmetics.

Mary T. Goldman's Gray Hair Color Restorer.—This dye of the silver-salt type has been on the market for many years. On March 14, 1940, the Federal Trade Commission ordered the Mary T. Goldman Company, St. Paul, and the Monroe Chemical Company, Quincy, Ill., to cease and desist from representing, among other things, that their preparation is not a dye and that it will cause gray, faded or streaked hair to change color without dyeing it; that it will restore the natural, original or youthful color to gray hair or remove all trace of gray hair in any other manner than as a dye. The order also prohibits the representation that anything less than repeated applications of the Goldman preparation will change the color of the user's hair or cause it to maintain the color imparted by the product, and forbids use of the word "restorer" as part of the brand name for the product. Representation that Mary T. Goldman is a living individual personally recommending the preparation, or personally corresponding with the users or prospective users thereof, is also prohibited under the order.

Mayco Nostrums.—These were promoted by May's Cut Rate Drug Company, Clarksburg, W. Va., May's Cut Rate Drug Company, Charleston, W. Va., and Pittsburgh Cut Rate Drug Company, McKeesport, Pa. The products in question included "Genuine Mayco English Crown Female Capsules for Delayed Periods" in ordinary, double and triple strengths. This was also designated simply "Mayco" by the Clarksburg and Charleston dealers. Examination revealed that it contained apiol green, ergotin, oil of savin and aloin in quantities sufficient to cause serious and irreparable injury to health if used under the conditions prescribed in the advertisements or under customary or usual conditions. On July 12, 1940, the Federal Trade Commission reported that it had ordered the defendant companies to cease representing that their product is a safe, competent and effective preparation for use in the treatment of delayed menstruation. The order further forbids advertisements which fail to reveal that the use of the preparation may result in serious and irreparable injury to health.

Mentho-Mulsion.—This product is put out by Mentho-Mulsion, Inc., of Atlanta, Ga., which was reported to be run by a Max L. Clein and a Sadie B. Clein. On Jan. 22, 1940, the Federal Trade Commission ordered it to cease and desist from making certain misrepresentations, such as that its "Mentho-Mulsion" is a cure or remedy for coughs or will stop cough spasms or prove efficacious in the treatment of coughs due to physical disorders of a systemic character, or of any coughs, aside from being a temporary relief for those due to common colds. The concern also was directed to cease representing that another of its products, "Malco Cold Tablets," will dry common colds out of the system, act as a cure or remedy for colds, or have any effect on them except as a relief from some of the symptoms commonly accompanying them.

Motex and Cote Nostrums.—A concern operating variously as the Western Refining Company, Inc., The Motex Company and Cote Products Company at Lowell, Mass., put out "Motex," "Motex Pills" and "Cote Pills." On April 6, 1940, the Federal Trade Commission ordered this outfit to cease and desist from representing that these products are safe, competent or scientific remedies for delayed menstruation, that they contain no harmful or dangerous drugs or that they will have no ill effects on the body. The order declared that their use may result in serious or irreparable injury to health. Still earlier, on July 21, 1939, the Post Office Department had debarred this concern from the use of the mails on the ground that its business constituted a fraud on the public. This case, designated as Fraud Order no. 13169, was reported in THE JOURNAL, April 20, 1940, p. 1574.

Premek 33.—This item is put out by The Patch Premek Corporation of Los Angeles, which had for its president one H. K. Patch and also traded under the name H. K. Patch Company. The Federal Trade Commission charged that this concern's advertising set forth its product "Premek 33" (sold to the medical profession as "C. S. 53") as an amazing new discovery effective for ending all kinds of irritations and capable of curing eczema, athlete's foot, chafing, shingles, ringworm and similar conditions. The Commission ordered the Patch concern to discontinue these misrepresentations on the ground that the only ingredient in the product which has any medicinal importance is colloidal sulfur, which is neither a new nor an amazing discovery and that the preparation is not a quick or effective treatment for the conditions named. Further, the order directed the company to cease representing that Premek 33 will kill bacteria, prevent reinfection or stop perspiration.

Scalf's Indian River Tonic.—On April 25, 1940, the Federal Trade Commission ordered the Indian River Medicine Company, La Follette, Tenn., to discontinue making certain misrepresentations for this product in its radio, newspaper and magazine advertisements. Among these were that the stuff will prevent and cure colds, build up resistance to other minor ailments, remedy asthma, rheumatism, sleeplessness, liver, kidney and stomach troubles and some other things.

Shampo-Kolor.—This was advertised by Valligny Products, Inc., New York. The Federal Trade Commission found the advertising to be exaggerated and misleading and on April 3, 1940, it ordered the concern to cease and desist from representing (1) that "Shampo-Kolor" will color the roots of the hair or have any effect thereon or on new hair growth, or restore the natural or original color to the hair, or affect the color of the hair in any way other than as a dye; (2) that anything less than repeated applications will cause the hair to retain the color imparted by the preparation; (3) that Shampo-Kolor is compounded or manufactured in France or in any country other than the United States, and (4) that it is "unique" or "revolutionary" in methods or results.

S. M. Laboratories Company.—This Seattle firm put out "Neofem Liquid," "Neofem Capsules" and "Cerene." The Federal Trade Commission, on May 19, 1940, reported that these products contained ergot, oil of savin and aloin in sufficient quantities to cause serious and irreparable injury if used under the conditions prescribed in the advertisements or under customary or usual conditions. It therefore ordered the concern to cease representing them as safe, competent or effective treatments for delayed menstruation.

Tommy Loughran Exercises.—Tommy Loughran of Philadelphia is engaged in the sale and distribution of correspondence courses that outline methods of physical culture, exercise and instruction as to diet for improving the health and physical condition of purchasers. On Oct. 25, 1940, the Federal Trade Commission ordered Loughran to cease and desist from representing directly or by implication that the following of these instructions will produce good health for every one or keep every one in healthy condition; will insure to every one "big" muscles or a "huge," "robust" and "powerful" body or enable one to become a "paragon" of strength, as such representations were held to be exaggerated and misleading.

Vita-Perles.—The Federal Trade Commission on March 21, 1940, ordered John H. Morgan, American Distributors, Inc., and Champion Products Company, Linton, Ind., and the United Advertising Companies, Inc., Chicago, to discontinue representing that "Vita-Perles" may be obtained and tested without risking the loss of any money; that backache, headache, leg pains and various other ailments are caused by a vitamin deficiency or that such conditions will be relieved or corrected by the use of the respondents' preparation; that those who are thin, pale and sickly will by the use of the preparation acquire additional weight, an improved complexion, an increased resistance to colds and infections, an improved appetite or will become less nervous; that the impairment or premature loss of sexual desire, vigor or potency in the male is due to a vitamin deficiency, or that these powers will be restored or improved by the use of the preparation, or that its use will increase the general strength and energy, or that the preparation will affect women's ability to conceive or bear children successfully, except in rare cases involving habitual involuntary abortion where inability to bear children successfully after conception may be due to a deficiency of vitamin E of a degree susceptible of replacement by the vitamin E content of the preparation.

Medical Examinations and Licensure

COMING EXAMINATIONS

BOARDS OF MEDICAL EXAMINERS

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Examinations of boards of medical examiners and boards of examiners in the basic sciences were published in THE JOURNAL, July 19, page 216.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: Parts I and II. Various centers, Sept. 10-12. Part III. Baltimore and New York City, October; Boston, November. Exec. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY: *Written. Part I.* Various centers, Nov. 1. Final date for filing application is Aug. 4. Sec., Dr. Paul M. Wood, 745 Fifth Ave., New York City.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOGY: *Written.* Nov. 3. Final date for filing application is Sept. 23. *Oral.* Dec. 12-13. Final date for filing application is Nov. 8. Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF INTERNAL MEDICINE: *Written.* Oct 20. Final date for filing application is Sept. 1. Sec., Dr. William S. Middleton, 1301 University Ave., Madison, Wis.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: *Oral.* St. Louis, Oct. 31-Nov. 1. Final date for filing application is Aug. 1. Sec., Dr. R. Glen Spurling, 404 Brown Bldg., Louisville, Ky.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Written. Part I. Group B.* Jan. 3. *Oral. Part II. Groups A and B.* Atlantic City, May or June. Final date for filing application is 90 days in advance of the examination. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh.

AMERICAN BOARD OF OPHTHALMOLOGY: *Oral.* Portland, July 15; Chicago, Oct. 18. *Written.* March 7, 1942. Sec., Dr. John Green, 6830 Waterman Ave., St. Louis.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: Washington, January. Final date for filing application is Nov. 1. Sec., Dr. Guy A. Caldwell, 1640 State St., New Orleans, La.

AMERICAN BOARD OF PEDIATRICS: *Oral.* Boston, Oct. 7-8, immediately following the annual meeting of the American Academy of Pediatrics. *Written.* Locally, Aug. 22. Sec., Dr. C. A. Aldrich, 707 Fullerton Ave., Chicago.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: *Oral.* New York, Dec. 19-20. Final date for filing application is Oct. 5. Sec., Dr. Walter Freeman, 1028 Connecticut Ave., N.W., Washington, D. C.

AMERICAN BOARD OF RADIOLOGY: *Oral. All groups.* Cincinnati, Sept. 19-21. Final date for filing application is Aug. 1. Sec., Dr. Byrl R. Kirklin, 102-110 Second Ave., S. W., Rochester, Minn.

AMERICAN BOARD OF SURGERY: *Written. Part I.* Various centers, Oct. 6. Sec., Dr. J. Stewart Rodman, 225 S. Fifteenth St., Philadelphia.

AMERICAN BOARD OF UROLOGY: *Written.* Various centers, December. *Oral.* Chicago, February. Final date for filing application is Nov. 1. Sec., Dr. Gilbert J. Thomas, 1009 Nicollet Ave., Minneapolis.

West Virginia March Report

The Public Health Council of West Virginia reports the oral and written examination for medical licensure held at Charleston, March 3-5, 1941. The examination covered 11 subjects and included 110 questions. An average of 80 per cent was required to pass. Six candidates were examined, all of whom passed. Thirteen physicians were licensed to practice medicine by reciprocity and 2 physicians so licensed on endorsement of credentials of the National Board of Medical Examiners. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Howard University College of Medicine		(1939)	91.5
Northwestern University Medical School		(1941)	88.5
Jefferson Medical College of Philadelphia		(1939)	88.5, 90.2
University of Tennessee College of Medicine		(1927)	86.1
Laval University Faculty of Medicine		(1940)	88.4

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Howard University College of Medicine		(1936)	Missouri
Emory University School of Medicine		(1928)	Georgia
University of Louisville School of Medicine		(1935)	Ohio, (1937) Kentucky
Ohio State University College of Medicine		(1931), (1937)	Ohio
Hahnemann Medical College and Hospital of Philadelphia		(1933)	Delaware
Temple University School of Medicine		(1924), (1934)	Penna.
University of Pittsburgh School of Medicine		(1938)	Penna.
Medical College of Virginia		(1938)	Michigan, Tennessee
University of Virginia Department of Medicine		(1937)	Virginia

School	LICENSED BY ENDORSEMENT	Year Grad.
Georgetown University School of Medicine		(1937, 2)

Oregon Reciprocity Report

The Oregon State Board of Medical Examiners reports 3 physicians licensed to practice medicine by reciprocity and 2 physicians so licensed on endorsement of credentials of the National Board of Medical Examiners, on April 3. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Yale University School of Medicine		(1931)	California
Northwestern University Medical School		(1936)	Illinois
Hahnemann Medical College and Hospital of Philadelphia		(1931)	Penna.

School	LICENSED BY ENDORSEMENT	Year Grad.
Rush Medical College		(1932)
Marquette University School of Medicine		(1935)

Rhode Island March Report

The Rhode Island Board of Examiners in Medicine reports the written examination for medical licensure held at Providence, March 4-5, 1941. The examination covered 8 subjects and included 50 questions. An average of 80 per cent was required to pass. Three candidates were examined, all of whom passed. One physician was licensed to practice medicine on endorsement of credentials of the National Board of Medical Examiners. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Syracuse University College of Medicine		(1938)	86
McGill University Faculty of Medicine		(1939)	90
University of Montreal Faculty of Medicine		(1940)	84.5

School	LICENSED BY ENDORSEMENT	Year Grad.
Harvard Medical School		(1937)

Oregon January Report

The Oregon State Board of Medical Examiners reports the written examination for medical licensure held at Portland, Jan. 14-16, 1941. The examination covered 12 subjects and included 90 questions. An average of 75 per cent was required to pass. Two candidates were examined, both of whom passed. Two physicians were licensed to practice medicine by reciprocity and one physician was so licensed on endorsement of credentials of the National Board of Medical Examiners. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
University of Oregon Medical School		(1939)	87.7, 92.3

School	LICENSE BY RECIPROCITY	Year Grad.	Reciprocity with
University of California Medical School		(1940)	California
University of Minnesota Medical School		(1928)	Minnesota

School	LICENSED BY ENDORSEMENT	Year Grad.
The School of Medicine of the Division of the Biological Sciences		(1936)

Arizona April Report

The Arizona State Board of Medical Examiners reports the written examination for medical licensure held at Phoenix, April 1-2, 1941. The examination covered 10 subjects and included 100 questions. An average of 75 per cent was required to pass. One candidate was examined and passed. Four physicians were licensed to practice medicine by reciprocity and 2 physicians so licensed on endorsement of credentials of the National Board of Medical Examiners. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Loyola University School of Medicine		(1940)	83.1

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Stanford University School of Medicine		(1937)	California
University of Maryland School of Medicine and College of Physicians and Surgeons		(1917)	Penna.
Ohio State University College of Medicine		(1923)	Ohio
University of Pittsburgh School of Medicine		(1930)	Penna.

School	LICENSED BY ENDORSEMENT	Year Grad.
Yale University School of Medicine		(1936)
Jefferson Medical College of Philadelphia		(1925)

Idaho April Report

The Idaho State Medical Examining Board reports the written examination for medical licensure held at Boise, April 1, 1941. The examination covered 23 subjects and included 140 questions. An average of 75 per cent was required to pass. Fifteen candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
College of Medical Evangelists		(1932)	89
Northwestern University Medical School		(1937)	91
Rush Medical College		(1939)	87
University of Chicago, The School of Medicine		(1939)	87
University of Louisville School of Medicine	(1930) 87,	(1939)	87
Louisiana State University School of Medicine		(1940)	89
University of Michigan Medical School	(1935) 94,	(1936)	92
University of Minnesota Medical School		(1939)	86
Creighton University School of Medicine		(1929)	93
Cotner University Medical Department		(1912)	81
Cornell University Medical College		(1937)	89
University of Nebraska College of Medicine		(1924)	88
Rheinische Friedrich-Wilhelms-Universität Medizinische Fakultät, Bonn		(1933)*	

* License has not been issued.

Vermont February Report

The Vermont State Board of Medical Registration reports the written examination for medical licensure held at Burlington, Feb. 11-13, 1941. The examination covered 12 subjects and included 90 questions. An average of 75 per cent was required to pass. Five candidates were examined, all of whom passed. Four physicians were licensed to practice medicine by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
George Washington University School of Medicine		(1939)	86.4
Georgetown University School of Medicine		(1937)	86.6
Boston University School of Medicine		(1924)	83.7
Tufts College Medical School		(1925)	83.2
University of Vermont College of Medicine		(1940)	87.5*

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
New York Medical College and Flower Hospital		(1937)	N. B. M. Ex.
University of Vermont College of Medicine		(1921)	New York, (1939) N. B. M. Ex.
University of Toronto Faculty of Medicine		(1924)	R. Island

* This applicant has completed four years' medical work and will receive the M.D. degree on completion of internship. License has not been issued.

Miscellany

A DEFENSE OF ANIMAL EXPERIMENTATION

Recent agitation regarding animal experimentation in the Hearst newspapers apparently stimulated the following editorial in the Chicago *Tribune*, July 15:

SPEAKING OF HORRORS

The most astonishing thing about the self-styled antivivisectionists is their pertinacity in a cause that is as thoroughly discredited as it is bad. They have not imposed their particular brand of insanity on a civilized community in years, yet they keep coming up for more.

Their most recent incursion has been at Peoria. The members of the city council, most of whom, by the law of averages, must have some member of their families who is alive today only because of medical progress through animal experimentation, have been subjected to the usual fictions regarding the horrors to be found in medical laboratories.

A recent dispatch noted that Dr. Anton J. Carlson had landed, and no doubt he has the situation in hand by now. The Peoria affair may safely be left to the doughty doctor and the good sense of the town's own people. It is a pity, however, that men like Dr. Carlson must, from time to time, drop their work against death and human misery to refute once again the time-frayed arguments of ignorance and perverted sentimentality.

Vivisection is an intentionally misleading word. The majority of experimental animals are not subjected to surgery. Those that are are almost invariably placed under a local or general anesthetic and are painlessly destroyed thereafter—the same fate experimental dogs would meet if they were left in the pounds from which medical laboratories obtain them.

Every medical or other scientific laboratory has the strictest rules, rigidly enforced, to prevent abuse of or cruelty to experimental animals. As scientists have frequently pointed out, the ordinary operations of husbandry, performed without anesthesia, subject animals to more pain in any single day than they have suffered in a century of laboratory experimentation.

The horrors that the antivivisectionists portray in experimental laboratories simply do not exist. But since they insist on following this theme of cruelty and agony, here are a few truthful instances—and they could be multiplied, literally, by millions—to which these people might give some attention.

Perhaps they would like to watch a golden haired child of 5 starve to death within a few months, in spite of the most tender care by parents and physicians. That was the almost inevitable fate of child diabetics until the discovery of insulin two decades ago. Insulin was discovered through experiments on dogs. The hundreds of thousands of diabetics whom it enables to lead normal lives are able to take it with safety only because doses are regularly standardized by experiments on other animals.

Or perhaps they would rather see the trapped agony in the eyes of the father of a family who had just been told that he had Addison's disease, an incurable malady that led to death in a short time. Addison's disease is no longer necessarily fatal. It is controlled by cortin, a drug found by experiments on dogs.

Or these self-styled apostles of gentleness might take their stand beside the parents who watch a child stricken with infantile paralysis, not knowing whether the disease will leave the child crippled in mind or body. The convalescent serum that has greatly reduced the fatality and crippling effects of this disease was developed by animal experimentation, which is being continued in the hope of finding a complete cure.

Perhaps they would like to watch the progress of a shambling hulk with a mind arrested in childhood by meningitis. This is one of the many diseases cured by the "miracle drugs" sulfanilamide and its chemical allies. The world would not have them if it had not been for animal experimentation.

Most people have seen a copy of Sir Luke Fildes' famous painting "The Doctor." It shows Queen Victoria's own physician sitting helplessly by in a humble cottage as a little girl chokes her life away with diphtheria. Such scenes were a commonplace in the childhood of the present generation of adults. They are rare today because of the antitoxin and the toxoid immunizing agents prepared in the bodies of horses and tested on other experimental animals.

The horrors of cancer need no elaboration. The search for the agents that cause it depends largely on the use of experimental animals. If the antivivisectionists had their way, that curse would remain on mankind forever.

The list can be extended almost indefinitely. The prevention of smallpox, yellow fever, typhus and lockjaw, the treatment of pneumonia, syphilis, scarlet fever, anemia, bubonic plague, gallbladder ailments and gastric ulcer, new technics in surgery, the whole range of vitamins and hormones, the marvelous anesthetic ethylene—all these and may other medical discoveries owe their debt to animal experimentation.

If the antivivisectionists are not moved by human suffering, perhaps they would rather watch a shivering, half paralyzed dog that has been stricken by distemper. The vaccines and serums that are 99 per cent effective in preventing or curing distemper were obtained by experiments on dogs. Pasteur experimented on dogs to develop the vaccine that saves both them and men from otherwise certain death from rabies. Experiments on dogs developed tetrachlorethylene as a cure for the hookworm that formerly killed so many pets. It has since been found useful in treating hookworm in humans.

Where does the cruelty lie—in the scientists who humanely use animals to end human suffering, or with the people who by stopping animal experimentation would deny humanity an indispensable weapon against the scourges that still beset it?

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Dental Practice Acts: Revocation of License Without Notice and Hearing Invalid.—A section of the dental practice act of Texas (Vernon's Ann. Civ. St. art. 4549) in general language authorizes the board of dental examiners to suspend or revoke a license to practice dentistry on proof that the licentiate has been convicted "for a felony involving moral turpitude." Thereafter the section specifically provides:

> Where the cause involves a criminal conviction . . . in some court of competent jurisdiction, the receipt by the Board of a certified copy of the records of the Court of Conviction showing a final conviction shall be sufficient evidence to justify *and require* such revocation by the State Board of Dental Examiners.

District courts, by other provisions in the section, are authorized, after notice and hearing, to suspend or revoke a license for stated causes other than the causes with respect to which the board has jurisdiction. The board of dental examiners without notice and hearing, revoked the license of Francisco to practice dentistry in Texas "on the ground that he had been convicted of forgery in the State of Oklahoma." The accused dentist then brought suit to require the reinstatement of his license and to cancel the board's order of revocation. From a refusal of the trial court to reinstate his license temporarily pending trial on the merits of the case, he appealed to the court of civil appeals of Texas, Austin.

Francisco contended that the provisions of the section under which his license was revoked were unconstitutional in that they failed "to provide for: (*a*) notice; (*b*) hearing; (*c*) court review; (*d*) appeal to any court; (*e*) trial by jury; and (*f*) notice and hearing before an impartial board or court, and right of appeal and review." The court of civil appeals first held apparently that the order of revocation was invalid because the language of the dental practice act relied on by the board as authority for revoking the license applies only to instances in which a licentiate had been convicted of a felony under the laws of Texas and not to out of state convictions. Thus the court did not find it necessary to pass on the constitutional issues raised by the dentist. Subsequently, however, the court held that the language referred to embraced also convictions in other states as well as in Texas and withdrew its former opinion, which seemingly was never published. Under this view the constitutional questions became controlling.

The court first pointed out that the general language giving the board authority to "suspend or revoke" a license was in irreconcilable conflict with the provisions specifically quoted by which "the receipt by the Board of a certified copy of the records of the Court of Conviction showing a final conviction shall be sufficient evidence to justify *and require* such revocation by the . . . Board," since the general language vested in the Board a discretion to suspend or revoke while the latter made revocation mandatory under the same circumstances. After resolving this conflict in favor of the mandatory language the court went on to discuss the constitutional issues involved.

The practice of dentistry, said the court, relating as it does to the public health, is subject to governmental control. The state has the power to prescribe reasonable regulations for the issue of licenses and may delegate to an administrative board or agency the authority to pass on the qualifications of applicants and to grant or refuse licenses. The state likewise may, for cause, revoke such licenses and may also delegate that function to such board or agency. On the other hand, once the right or privilege to engage in the practice of dentistry has been lawfully acquired, that right or privilege is protected by the due process clauses of the state and federal constitutions.

It is generally conceded, continued the court, that due process includes reasonable notice and the right to be heard. This is true whether the tribunal exercising jurisdiction over rights or privileges protected by the due process clause is a judicial, legislative, executive or administrative one. The court then quoted from 12 Am. Jur. 307 as follows:

> The rule that a hearing before judgment or order is not necessary to due process is especially applicable to proceedings before commissioners and boards, such as public utility commissioners, banking superintendents, etc. There is no violation of due process if provision is made for a trial de novo before a court of the issues passed upon by such a commission, for a judicial review of the order, even a review by mandamus, provision for suspending or setting aside the order, for a hearing before the order is put into effect, or for a rehearing upon application.

However, said the court, even when judicial review of an administrative agency's order is accorded, if no stay of the effect of such order is provided, and if, meanwhile, irreparable injury would result, subjecting the party affected by the order to criminal prosecution for its violation, due process is not satisfied. Tested by these rules, the procedure provided for the revocation of licenses under the provisions of the dental practice act here in question clearly does violence to the invoked constitutional guaranties of due process. No character of notice, hearing or review of the order of revocation is provided. The order operates instanter, and the licentiate is at once deprived of his right lawfully to practice his profession.

Apparently it was contended that the state had the right to provide for the forfeiture of a license ipso facto on conviction of a felony involving moral turpitude, and that, since the board is not vested with any discretionary powers in the matter, notice and hearing would perform no useful purpose. The answer to this, said the court, if it is otherwise sound, is that the legislature has not provided for an automatic revocation of a license but requires an order of the board. Until an order of revocation is made by the board the license remains in effect. Before the board can act intelligently or properly there are a number of matters it must ascertain. First, it must be shown that the licentiate and the defendant in the judgment of conviction is one and the same person. If the conviction was had in another jurisdiction, the following matters must be determined also: (1) the jurisdiction of the convicting court; (2) the sufficiency of the certified record to show a final conviction in the jurisdiction, and (3) whether or not the crime for which a conviction was had is in fact a felony and involves moral turpitude. The licentiate is entitled, the court believed, to a hearing on these matters before his license is revoked, and procedure authorizing a summary revocation of a license without such notice and hearing constitutes a denial of due process under both state and federal constitutions.

For the reasons stated the court, in effect, remanded the case to the trial court, instructing it to grant an injunction temporarily reinstating the license pending a trial on the merits of the case. At the same time the court overruled a motion made by the board for a rehearing.—*Francisco v. Board of Dental Examiners, 149 S. W. (2d) 619 (Texas, 1941).*

Society Proceedings

COMING MEETINGS

American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Hot Springs, Va., Sept. 11-13. Dr. James R. Bloss, 418 Eleventh St., Huntington, W. Va., Secretary.

American Association of Railway Surgeons, Chicago, Sept. 8-10. Dr. Daniel B. Moss, 547 West Jackson Blvd., Chicago, Secretary.

American Congress of Physical Therapy, Washington, D. C., Sept. 1-5. Dr. Richard Kovacs, 2 East 88th St., New York, Secretary.

American Hospital Association, Atlantic City, N. J., Sept. 15-19. Dr. Bert W. Caldwell, 18 East Division St., Chicago, Executive Secretary.

Colorado State Medical Society, Estes Park, Sept. 17-20. Mr. Harvey T. Sethman, 537 Republic Bldg., Denver, Executive Secretary.

Michigan State Medical Society, Grand Rapids, Sept. 16-18. Dr. L. Fernald Foster, 2020 Olds Tower, Lansing, Secretary.

National Medical Association, Chicago, Aug. 18-22. Dr. John T. Givens, 1108 Church St., Norfolk, Va., General Secretary.

Northern Minnesota Medical Association, St. Cloud, Aug. 15-16. Dr. Clarence Jacobson, Chisholm, Secretary.

Oregon State Medical Society, Portland, Sept. 3-6. Dr. M. L. Bridgeman, 1020 S. W. Taylor St., Portland, Secretary.

Rocky Mountain Medical Conference, Yellowstone Park, Wyo., Sept. 2-4. Mr. W. H. Tibbals, 610 McIntyre Bldg., Salt Lake City, Secretary.

Washington State Medical Association, Seattle, Aug. 24-26. Dr. Vernon W. Spickard, 1305 Fourth Ave., Seattle, Secretary.

Wisconsin, State Medical Society of, Madison, Sept. 10-12. Mr. G. B. Larson, 110 East Main St., Madison, Assistant Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1931 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Heart Journal, St. Louis

21:401-544 (April) 1941

Coronary Embolism. L. Hamman, Baltimore.—p. 401.
Blood Volume and Cardiovascular Adjustments. H. C. Bazett, Philadelphia.—p. 423.
Roentgenologic Studies of Size of Heart in Childhood: I. Three Different Types of Teleroentgenographic Changes Which Occur in Acute Rheumatic Fever. Helen B. Taussig and M. Goldenberg, Baltimore.—p. 440.
Metastatic Bronchiogenic Carcinoma of Heart: Report of Case, with Clinical Diagnosis by Progressive Electrocardiographic Changes and Pathologic Confirmation. J. R. Reuling, Bayside, N. Y., and L. Razinsky, Far Rockaway, N. Y.—p. 470.
Circulatory Effects Following Intravenous Administration of Pitressin in Normal Persons and in Patients with Hypertension and Angina Pectoris. A. Graybiel and R. E. Glendy, Boston.—p. 481.
Effect of Short Wave Diathermy on Cutaneous Temperatures of Feet. R. L. Bennett, E. A. Hines Jr., and F. H. Krusen, Rochester, Minn.—p. 490.
Crystal Microphone for Pulse Wave Recording. A. Miller and P. D. White, Boston.—p. 504.
Circulatory Adjustments in Polycythemia Vera. H. J. Stewart, C. H. Wheeler and N. F. Crane, New York.—p. 511.

American Journal of Clinical Pathology, Baltimore

11:263-360 (April) 1941

*Hemorrhagic Diathesis: Review of 310 Cases. R. L. Haden and R. W. Schneider, Cleveland.—p. 263.
Histopathology of Liver Following Superficial Burns. L. J. Buis and F. W. Hartman, Detroit.—p. 275.
Preparation and Preservation of Human Plasma: II. Drawing Off, Pooling and Distribution of Plasma. M. M. Strumia and J. J. McGraw, Bryn Mawr, Pa.—p. 288.
Studies on "Stored Blood": I. Technic for Storage Blood. R. O. Muether and K. R. Andrews, St. Louis.—p. 307.
Id.: II. Effect of Storage on Human Blood. R. O. Muether and K. R. Andrews, St. Louis.—p. 314.
Id.: III. Effects of Stored Blood on Recipient. R. O. Muether and K. R. Andrews, St. Louis.—p. 321.
Serum Antistaphylolysin Titers During Antitoxic Therapy of Staphylococcic Infections. C. Weiss, San Francisco.—p. 329.
Histoplasmosis in Infancy: Report of Case. W. A. D. Anderson, I. D. Michelson and T. M. Dunn, St. Louis.—p. 344.

Hemorrhagic Diathesis.—Haden and Schneider studied the blood of 310 patients presenting abnormal bleeding. In 119 purpura was the indication for the study, in 116 it was gross hemorrhage (epistaxis, hematuria, melena and extensive ecchymoses) without a local lesion explaining the bleeding or the hemorrhage was out of proportion to the injury or local disease, while the remaining 75 patients fell into a number of small groups (jaundice, preoperative and postoperative hemorrhage, hemophilia, thrombasthenia and so on). A disturbance in the clotting factor was demonstrable in only 132 of the 310 patients, suggesting that the vascular defect (increased permeability of the walls of the vessel) is more important than the clotting defect in clinical pathologic hemorrhage. The purpuras were subdivided into those with and those without platelet deficiency to explain the abnormal bleeding. The thrombopenic purpuras were further divided into the idiopathic and the secondary type. The 1 patient, among the 19 in the idiopathic group, with a platelet count of 120,000 showed clot retraction; in all the others (with counts from 90,000 to 50,000) clot retraction was absent. The bleeding time was abnormally prolonged in all except the 1 patient with the highest platelet count. In 7 patients of this group the coagulation time was prolonged although never greatly so. From this it is evident that the vascular permeability component of the platelets was lacking in all, while the thromboplastin factor was lacking in a few. The results were much the same in the symptomatic thrombopenia group, although the platelet count of 4 patients was above 100,000, all of whom showed clot retraction. The bleeding time of only 2 was not prolonged. The coagulation time of 19 was prolonged. The most common causes for the secondary thrombocytopenia were leukemia, aplastic anemia, congestive splenomegaly (Banti's syndrome), drugs and infections. In 74 patients purpura was present in the absence of deficiency of platelets. Most important in purpura were allergy, rheumatic disease and renal disease. The blood of 35 of these showed no abnormality except a slightly prolonged coagulation time in 3 patients. The coagulation time of 12 of the remaining 39 was prolonged; no other abnormality was observed. The bleeding time was never prolonged significantly in the absence of a platelet deficiency, and clot retraction was always present. In this group the bleeding was evidently not due to a demonstrable thromboplastin deficiency, as the platelets were not decreased. Some other factor apparently determined the increased vascular permeability. The only observation among the 116 patients presenting a gross hemorrhage unexplained by a local lesion was a prolonged coagulation time in 36. The coagulation time was from fifteen to twenty minutes in most instances; in 4 it was longer than twenty minutes. This observation might explain the abnormal bleeding. A deficiency in thromboplastin has been excluded by the presence of a normal number of platelets unless a qualitative defect is present. It is conceivable that there may be a qualitative defect in the platelets. Anticoagulants were tested for and no deficiency of prothrombin was found. The mechanism of the prolonged coagulation time in the absence of a platelet deficiency is not clear. Most of the jaundiced patients were studied before adequate determination of prothrombin was available. It is now evident that a deficiency of prothrombin is the cause for the prolonged coagulation. The platelets and clot retraction were always normal. The hemophilia patients showed the characteristic prolonged clotting time with a normal platelet count and clot retraction. The patients with thrombasthenia presented thrombopenic bleeding without a decrease in platelets. Their coagulation and bleeding time was prolonged but the clot retraction was normal. Two patients were mother and son.

Annals of Surgery, Philadelphia

113:481-640 (April) 1941

Endemic Goiter in Japan. K. Kawaishi and Y. Hashimoto, Taihoku, Formosa, Japan.—p. 481.
Surgery of Thyroid in a Large Municipal Hospital. R. V. Grace and C. Weeks, New York.—p. 496.
*Branchial Cysts and Sinuses. F. H. Lahey and H. F. Nelson, Boston.—p. 508.
*Intra-Abdominal Apoplexy. J. E. Berk, N. S. Rothschild and J. C. Doane, Philadelphia.—p. 513.
Intractable Gastric Ulcer with Final Malignant Change Associated with Benign Tumor of Brain. P. H. T. Thorlakson and Sarah Meltzer, Winnipeg, Man., Canada.—p. 521.
Giant Diverticulum or Duplication of Intestine with Recurrent Perforations. J. W. Duckett, Dallas, Texas.—p. 528.
Topography and Development of Cecum-Appendix. C. F. De Garis, Oklahoma City.—p. 540.
Benign Tumors of Ovary Associated with Ascites and Pleural Effusion: Report of Case of Multilocular Cystadenoma. W. F. MacFee, New York.—p. 549.
Studies on Cerebrospinal Fluid Pressure in Unanesthetized Dogs. J. E. Webster and N. E. Freeman, Philadelphia.—p. 556.
Induction of Liver Necrosis in Rabbits by Combination of Experimental Hyperthyroidism and Shope Papilloma. W. C. Sealy, Durham, N. C.—p. 572.
Perineal Prostatotomy and Prostatectomy for Removal of Prostatic Calculi. R. Gutierrez, New York.—p. 579.
Hydrocele of Canal of Nuck: Report of Seventeen Cases. V. S. Counseller and B. M. Black, Rochester, Minn.—p. 625.

Branchial Cysts and Sinuses.—Lahey and Nelson report 27 cases of branchial cysts and sinuses in which operation was performed during the last ten years. Wenglowski's theory as to the etiology of branchial cysts and sinuses, as interpreted by Meyer, is generally accepted. Wenglowski formulated that the branchial apparatus begins to take place in the third and fourth weeks of embryonic life and disappears during the second month. The branchial apparatus extends forward, upward and orally and the pharyngeal apparatus posteriorly downward and below the mouth. The arches grow closer in embryonic life until the cleft disappears and the epithelium is displaced out-

ward by the mesenchymal growth or by adhesion and obliteration. The first arch forms the lateral portion of the upper lip and maxilla, the lower lip and mandible and the tongue; the second arch the hyoid bone, the stylohyoid ligament and muscle, the anterior base of the tongue and the arcus palatoglossus, and the third arch the greater cornu of the hyoid bone, the posterior base of the tongue and the arcus pharyngopalatinus. The fourth, fifth and sixth arches make up the soft parts of the neck surrounding the greater cornu of the hyoid. The first cleft forms the external auditory canal and the lobe of the ear, the second cleft the tonsillar fossa, the third cleft the thymus and the fourth cleft the lateral lobes of the thyroid. Meyer believes that the branchial apparatus belongs to the head and not the neck and that any congenital pathologic condition must rest along the mandible adjacent to the hyoid bone and the cornu of the hyoid bone. Any congenital anomaly below the lower border of the hyoid bone must be classified as a lateral cyst or fistula originating from the pharyngothymic duct. The condition is usually found in young people, predominantly in females. Fifty-six per cent of the authors' patients were less than 30 years of age and 70 per cent were females. The usual symptoms attributed to branchial cysts and sinuses are a tumor of the neck, a sinus with an intermittent or continuous discharge of secretion and recurrent attacks of inflammation, and occasionally an unexplained cough. The duration of symptoms of the present group varied from three days to twenty years, the average being four and a half years. Only 57 per cent of the cysts were diagnosed before operation. Many conditions which are common in the neck must be considered: dermoid cysts, cystic hygromas, lipomas, thyroglossal cysts and sinuses, tuberculous adenitis and sinuses, venous hemangiomas, deep cervical abscesses, actinomycosis, Hodgkin's disease, lymphosarcoma, lymphatic leukemia, carotid body tumors and various cervical metastatic neoplasms. Branchial sinuses and cysts occur with about equal frequency on the two sides of the neck; 56 per cent in the authors' series were on the right and 40 per cent on the left. In 1 case there were bilateral fistulas. Various types of treatment have been reported. Most surgeons advocate complete excision of the sinus tract or cyst. Recurrence has not taken place in any of the 27 cases following complete surgical excision.

Intra-Abdominal Apoplexy.—According to Berk and his co-workers, the term "intra-abdominal apoplexy" aptly describes the spontaneous occurrence and nature of the condition, a spontaneous rupture of an intra-abdominal blood vessel independent of direct trauma to the abdomen. An exhaustive study of the literature reveals only 19 such cases, to which the authors add a case of their own. Analysis of the 20 cases reveals that the accident occurred in an approximate ratio of 3 males to 1 female whose ages varied from 27 to 73 years, with the greatest frequency between 45 and 55 years of age. Ten patients had evidence of a definite hypertension, and in 2 others marked arteriosclerosis was found at postmortem. No definite bleeding point could be found in 6 of the younger patients (average age 41.5 years, or ten years less than the average for the entire group). In 4 of these 6 the cardiovascular state was apparently normal. Of the 5 patients with an apparently normal cardiovascular state no definite bleeding point could be found at operation or at postmortem examination in 4. The practical implication of the close association between age, occurrence, a relatively normal cardiovascular apparatus and no bleeding point becomes more apparent when the operative results are analyzed. Sixteen of the 20 patients were operated on and 11 recovered. Of the 5 who died, 4 had no definite bleeding point. It would seem that, despite the occurrence of a massive intraperitoneal hemorrhage, if a definite bleeding point can be located at operation and the bleeding vessel ligated the chance of recovery is excellent. In no instance was a correct diagnosis made prior to operation. Perforated peptic ulcer was generally suspected. All cases were considered as acute abdominal catastrophes, but an abdomen full of blood was a distinct surprise. Scrutiny of all the symptoms and signs reveals nothing pathognomonic of the condition. Only the absence of gross trauma, dominant digestive complaints or previous similar occurrences are of some aid in the differential diagnosis. The condition should be considered whenever there occur sudden severe abdominal pain, shock and signs of peritoneal irritation especially in a known hypertensive person. The high incidence (60 per cent) of hypertension and arteriosclerosis in the reported series suggests that local disease of the blood vessels must be the basic, underlying factor. A recent report by Morlock tends to substantiate such a conclusion. He demonstrated that the blood vessels of the gastrointestinal tract of hypertensive persons of all ages, as compared to normal persons, showed measurable thickening of the arteriolar wall and reduction of the ratio of wall to lumen. In such blood vessels, hyperplasia of the nuclear elements of the media occurred early, to be followed later by degeneration and fibrosis. The spontaneous feature is an important one. The precipitating cause is in most instances hidden and unexplainable. Given a basic, underlying local disease or congenital defect, anything tending to raise the intravascular pressure within that diseased or defective vessel might result in a rupture at the weakened site. Hypertension, the use of pitressin, sudden emotional strain, excessive eating, coitus or heavy lifting might well predispose to a "blowing out" of a blood vessel.

Archives of Pathology, Chicago

31:411-532 (April) 1941

Cutaneous Carcinoma: I. Statistical Analysis with Respect to Duration and Size of Tumors and Age of Patients at Onset and at Biopsy of Tumor. R. Schrek, Hines, Ill., and Olive Gates, Boston.—p. 411.
Id.: II. Statistical Analysis with Respect to Measures of Innate and Clinical Malignancy. R. Schrek, Hines, Ill.—p. 422.
Id.: III. Statistical Analysis with Respect to Site, Sex and Preexisting Scars. R. Schrek, Hines, Ill.—p. 434.
*Medial Coronary Sclerosis in Infancy. C. E. Brown and Ina M. Richter, Santa Barbara, Calif.—p. 449.
Relation of Concentration of Red Blood Cells to Sensitivity of Isoagglutination Reaction: Its Importance in Demonstration of Agglutinin in Dried Blood Stains. H. Lund, Boston.—p. 458.
*Hypertrophy and Hyperplasia of Islets of Langerhans of Fetus and of Newborn Infant. Edith L. Potter, H. P. G. Seckel and W. A. Stryker, Chicago.—p. 467.
Anatomic and Behavior Changes Produced by Partial Hepatectomy in Rat. E. C. H. Schmidt Jr. and C. P. Richter, Baltimore.—p. 483.
Tissue Anomalies of Probable Neural Crest Origin in a Twenty Millimeter Human Embryo with Myeloschisis. P. Gruenwald, Chicago.—p. 489.
Intercapillary Glomerulosclerosis. P. A. Herbut, Philadelphia.—p. 501.
Relation of Chemical Composition of Lipids to Characteristic Tissue Lesions. E. F. Hirsch, Chicago.—p. 516.

Medial Coronary Sclerosis in Infancy.—Brown and Richter cite the 6 cases of medial coronary sclerosis gleaned from the literature and 1 of their own. The cases are clinically important because of ischemic phenomena apparent in the myocardium with which the coronary lesions were associated, as judged by clinical signs in some cases and by microscopic sections in others. The 7 cases do not include instances of arterial calcification in infants in which the coronary arteries were not mentioned nor visceral calcification in infants in which the general arterial system was uninvolved or not mentioned. The arterial changes in the 6 cases were essentially the same as those in the authors' case except that in some the calcifications involved the aorta and its major branches in addition to the coronary arteries. The patient, a boy born of a healthy primiparous 21 year old mother, developed normally and gained weight up to a week before death at the age of 3½ months. On the night before death he suddenly became dyspneic and cyanotic and vomited once. When admitted to the hospital he was alternately pale and cyanotic, the respirations were rapid and the heart sounds were too rapid to count. Epinephrine and codeine appeared to give slight relief, but after two short tonic convulsions the child died, less than twenty-four hours after the onset of symptoms. A postmortem examination was made two and one-half hours after death. The external appearance was entirely normal. The pericardium was normal. The heart, particularly the right ventricle, appeared slightly enlarged. The epicardium was smooth, the myocardium was pale and the endocardium displayed superficial smooth white streaks. On the line of closure of the mitral and tricuspid leaflets there were occasional minute smooth blood-stained elevations. The coronary arteries appeared more prominent and tortuous than usual but were not sufficiently abnormal to excite suspicion. The ribs, vertebrae, extremities and internal organs appeared to be

normal. The mesenteric lymph nodes were soft and gray. The coronary arteries and their major branches were characterized by disruption and calcification of the internal elastica, edema and fibroblastic proliferation of the intima and atrophy of the muscle fibers of the media. The changes were most advanced in the circumflex branch. In a section of the left anterior descending branch the internal elastica could be identified as an irregularly thickened band on which calcium appeared encrusted. Wandering cell infiltrations were at a minimum. The lesions on the mitral and tricuspid valves were made up of ectatic capillaries. The endocardium, particularly in the auricles, was thickened. In most of the renal glomeruli the cells of the capillary loops were swollen and the lumens scanty. The epithelium of the convoluted tubules was swollen. About a fifth of the internal elastica and media of an arcuate artery seen in longitudinal section showed calcification. The elastica in the involved portion was irregularly thickened, and the muscle fibers of the media were opaque and blue. Similar changes were observed in a small adrenal artery in the pericapsular fat. The alveolar spaces of the lung were partially obliterated by apparent collapse of their walls. The spleen, liver and thymus were normal. In the absence of inflammatory or obstructive renal changes, or of gross osseous abnormalities, mention is made of the possibility of primary hyperparathyroidism, alteration of the calcium-phosphorus balance from the administration of viosterol to the mother and child or some innate degenerative arterial change in the child. The authors' data on the use of viosterol are not sufficiently complete to exclude this possibility, but it is unlikely. The amount of vitamin D given to this infant and to the one seen by Lightwood is not comparable to the doses given experimentally to produce similar lesions in animals. The cause of the lesion is in doubt, although some alteration in the calcium and phosphorus metabolism is suspected.

Hypertrophy and Hyperplasia of Islets of Langerhans.—Potter and her associates found instances of hypertrophy and hyperplasia of the islet tissue of pancreases of infants born to nondiabetic mothers. The almost universal acceptance that the phenomenon is due to maternal diabetes suggested the desirability of reviewing cases found in the literature, as well as of the 14 encountered by them. Their cases, with a single exception, were discovered during routine microscopic examination of 450 pancreases from nonmacerated fetuses, premature infants and infants born at term examined post mortem. The necropsy series included 4 infants born of diabetic mothers and 22 infants suffering from erythroblastosis. The cases fall into four groups. Group A consists of 24 previously and 2 newly reported cases in which the mothers were stated to have been diabetic; group B of 3 infants (1 observed by the authors) whose mothers may have had diabetes; group C of 16 infants whose mothers had no clinical evidence of diabetes during pregnancy, and group D 10 infants without associated erythroblastosis (2 cases previously reported) and 6 infants with erythroblastosis (3 cases previously reported). In most of the cases there was no correlation between the increase of islet tissue and the severity of diabetes, the state of control or the change in sugar tolerance of the mother during pregnancy. There is also little correlation between the amount of islet tissue found at necropsy and the blood sugar levels before death of those infants who died during the neonatal period. The authors conclude that an increase in fetal islet tissue may be found in the presence or absence of abnormal sugar metabolism in the mother or the infant.

Arkansas Medical Society Journal, Fort Smith

37:255-276 (May) 1941

X-Ray Examination in Ileus and Intestinal Obstruction. I. H. Lockwood, Kansas City, Mo.—p. 255.

Bulletin New York Academy of Medicine, New York

17:325-402 (May) 1941

Oliver Wendell Holmes: Precursor of Freud. C. P. Oberndorf, New York.—p. 327.
Newer Conceptions of Postinfectious and Related Forms of Encephalitis. T. J. Putnam, New York.—p. 337.
Thrombophlebitis. I. S. Wright, New York.—p. 348.
Newer Knowledge of Blood Transfusions. J. Scudder, C. R. Drew, Elizabeth Tuthill and Margaret E. Smith, New York.—p. 373.

Canadian Public Health Journal, Toronto

32:143-230 (April) 1941

Milk: The Protected, Protective Food. E. W. McHenry, Toronto.—p. 143.
Consumption of Milk in Canada. W. C. Hopper, Ottawa, Ont.—p. 147.
Milk Consumption in the Vancouver Metropolitan Area. J. S. Kitching, Vancouver, B. C.—p. 154.
Educational Program to Raise Nutrition Levels Through Increased Milk Consumption. M. Frances Hucks, Toronto.—p. 158.
Production of Clean Milk. A. R. B. Richmond, Toronto.—p. 163.
Tests for Milk Quality. C. K. Johns, Ottawa, Ont.—p. 169.
Transmission of Animal Diseases to Man Through Milk. M. P. Ravenel, Columbia, Mo.—p. 174.
Present Status of Milk-Borne Disease Hazards. C. E. Dolman, Vancouver, B. C.—p. 183.
Contagious Abortion of Cattle and Undulant Fever in Man. J. S. Fulton, Saskatoon, Sask.—p. 194.
Engineering Features of Pasteurizing Plants and Equipment. G. A. H. Burn, Toronto.—p. 199.
Progress in Pasteurization in Ontario. A. E. Berry, Toronto.—p. 208.
Phosphatase Test. P. J. Moloney, Toronto.—p. 213.

Cancer Research, Philadelphia

1:259-344 (April) 1941. **Partial Index**

Occurrence and Pathology of Spontaneous Carcinoma of Lung in Mice. H. G. Wells, Maud Slye and Harriet F. Holmes, Chicago.—p. 259.
Production of Tumors by Tobacco Tars. C. M. Flory, Chicago.—p. 262.
Studies on Prostatic Cancer: I. Effect of Castration, of Estrogen and of Androgen Injection on Serum Phosphatases in Metastatic Carcinoma of Prostate. C. Huggins and C. V. Hodges, Chicago.—p. 293.
Failure to Find Carcinogens in Urine from Patients with Cancer. R. O. Bowman and H. R. Mottshaw, Providence, R. I.—p. 308.
Glucose Tolerance Test in Its Relation to Cancer. G. L. Rohdenburg, New York.—p. 311.
Fate of Spontaneous Mammary Carcinomas in Mice After Simple Biopsy. R. Lewisohn, C. Leuchtenberger, R. Leuchtenberger and D. Laszlo, New York.—p. 324.

Connecticut State Medical Journal, Hartford

5:241-316 (April) 1941

Thrombophlebitis, with Particular Reference to Treatment. H. Mahorner, New Orleans.—p. 243.
Connecticut Medical Bibliography. W. R. Steiner, Hartford.—p. 248.
Nature and Treatment of Epilepsy. T. J. Putnam, New York.—p. 257.
Symptoms Compelling Attention to Heart. L. H. Nahum and P. Piccolo, New Haven, Conn.—p. 261.
Conservative Treatment in Fractures of Neck of Humerus. J. J. Moorhead, New York.—p. 267.
Survey of Anesthesia Service at Grasslands Hospital, 1938 to 1940. H. F. Bishop, Valhalla, N. Y.—p. 270.

Journal of Aviation Medicine, St. Paul

12:1-112 (March) 1941

Combined Electrocardiography, Stethography and Cardioscopy in Selection of Pilots. W. M. Bartlett, Benton Harbor, Mich., and J. B. Carter, Chicago.—p. 2.
*Effect of Low and High Oxygen Tensions on Mental Functioning. A. L. Barach, New York.—p. 30.
Mask Apparatus Which Provides High Oxygen Concentrations with Accurate Control of Percentage of Oxygen in Inspired Air and Without Accumulation of Carbon Dioxide. A. L. Barach and M. Eckman, New York.—p. 39.
Recent Trends in Aviation Medicine. J. R. Poppen.—p. 53.
Civil Aeronautics Medical Forum. W. R. Stovall, Washington, D. C.—p. 72.

Effect of Oxygen Tension on Mental Functioning.—Barach compared the effects of low and high oxygen concentrations on the mental activity of 17 medical students and 9 psychoneurotic patients. The subjects breathed an atmosphere of 13 per cent oxygen (equivalent to an altitude of 12,400 feet) for three hours. Impairment of emotional control was demonstrated in all 17 students. In 50 per cent elation and overconfidence were first manifested; these conditions were followed by headache and lethargy. In 41 per cent mental dulness continued throughout the experiment with headache at its termination. The patients showed a more pronounced lack of emotional restraint, exaggerated self esteem and inability of inhibiting instinctive drives. The mood of 5 patients changed from a hypomanic state to dulness and lethargy, and 4 patients had dulness and apathy from the beginning. A phenomenon not generally recognized is that inhalation of 50 per cent oxygen in patients with a previously existing chronic anoxia may temporarily produce a profound disturbance in mental functioning. This is likely to occur especially in cases of pulmonary emphysema and pulmonary fibrosis in which the arterial oxygen

saturation has been lowered over a long period. Deep sleep and stupor occurred, followed in some instances by coma and delirium. Milder manifestations were headache, depression and a variable degree of irrationality. When the patients became acclimatized to the increased oxygen tension the mental disturbance disappeared and was followed by a cheerful and optimistic mood. In most instances the duration of the disorder produced by inhaling 50 per cent oxygen lasted for from two to four days; in 1 a deep sleep verging on coma lasted for seven days. Inhalation of high oxygen atmospheres did not alter the mental function of normal subjects.

New England Journal of Medicine, Boston

224:533-582 (March 27) 1941

Acute Cholecystitis. R. Zollinger, Boston.—p. 533.
Causes of Indigestion and Their Recognition. T. G. Miller, Philadelphia. —p. 537.
Unusual Case of Subdural Hematoma. J. T. B. Carmody, Worcester, Mass.—p. 541.
Pharmacologic and Clinical Reevaluation of Amphetamine (Benzedrine) Sulfate. W. M. Cameron and J. Kasanin, San Francisco.—p. 544.
Encephalopathy Following Neoarsphenamine Therapy. E. Roseman and C. D. Aring, Cincinnati.—p. 550.
Tuberculosis. D. S. King, Brookline, Mass.—p. 554.

224:627-672 (April 10) 1941

Convalescent Care of Children with Heart Disease Due to Rheumatic Fever: Survey of Problem of Care of Children with Rheumatic Heart Disease. P. D. White, Boston.—p. 627.
Rheumatic Fever in Childhood, with Especial Reference to Five Year Study of Home and Foster-Home Care. E. F. Bland, Boston.—p. 629.
Medical-Social Program for the Child with Rheumatic Fever. Edith M. Terry, Boston.—p. 632.
Social Services to Children with Rheumatic Fever. Virginia B. Ebert, Boston.—p. 634.
Pseudocyesis. R. N. Rutherford, Boston.—p. 639.
Management of Preeclampsia. F. L. Adair, Chicago.—p. 644.
Etiology and Treatment of Urticaria: Diagnosis, Prevention and Treatment of Poison Ivy Dermatitis. P. C. Baird Jr., Boston.—p. 649.

224:673-710 (April 17) 1941

Mycotic Infections of Skin. O. S. Ormsby, Chicago.—p. 673.
Development of the Concept of Hypertensive Heart Disease. D. Davis and M. J. Klainer, Boston.—p. 679.
Pulmonary Fibrosis in Raynaud's Disease. H. Linenthal and R. Talkov, Boston.—p. 682.
Allergy, with Special Reference to Drug Allergy. F. M. Rackemann, Boston.—p. 688.

224:711-754 (April 24) 1941

*Tuberculous Infection Among Nurses and Medical Students in Sanatoriums and General Hospitals. P. Dufault, Rutland, Mass.—p. 711.
Hematoma of Brain. P. J. Buckley and J. M. McKinney, New York. —p. 716.
Hypothyroidism in Infants and Children, with Reference to Ultimate Prognosis Concerning Intelligence and to Withdrawal of Thyroid Therapy as Diagnostic Measure. R. P. Goodkind and H. L. Higgins, Boston.—p. 722.
Acute Laryngeal Obstruction as Complication of Measles. H. H. Shuman, Fitchburg, Mass.—p. 727.
Hematology. W. Dameshek, Boston.—p. 729.

Tuberculosis Among Nurses and Medical Students.—Dufault states that reports appearing before 1925 claimed that the incidence of tuberculosis among nurses, medical students and physicians was not higher than among the general population. The literature after 1925 and his own observations indicate a higher morbidity rate among the nursing personnel. Infection of medical students has come to the attention of epidemiologists. A wealth of material has been accumulated in various medical schools in this country and abroad indicating that the morbidity rate from tuberculosis among the second, third and fourth year medical students is higher than that among other young men and women of the same age group. A recent report by Hedvall from Lund University, Sweden, gives the highest as yet officially reported infection rate among this group. The most enlightening part of Hedvall's report is the tracing of the main source of infection to the necropsy room. Samples from towels, trays and tables twenty-four hours after a necropsy contained tubercle bacilli on cultures, in spite of all precautions during the postmortem procedure. That the danger of contamination from this source may be serious is further demonstrated by data obtained from various hospitals in Massachusetts. In 3,766 postmortems at the Boston City Hospital tuberculosis was found to be the primary or contributory cause of death in 285 cases, a rate of 7 per cent for 1935 to 1939 inclusive. The Worcester State Hospital reported a 6 per cent rate for 1937 and 1938. In the same year the Worcester Hahnemann Hospital had 3.8 per cent, the Worcester Memorial Hospital 2.7 per cent and St. Vincent Hospital 1.5 per cent. From the Worcester City Hospital comes the surprisingly low figure of 0.9 per cent for the years 1934 to 1938 inclusive. At the Buffalo General Hospital and Children's Hospital Terplan reported that the incidence of tuberculous lesions at the necropsy of about 700 children and young adults was 5.9 per cent among those younger than 7 years and 19.4 per cent among those between 7 and 18 years. The percentage of tuberculous foci found in the necropsy room of general hospitals indicates that there may be more lesions in the wards than are suspected. Of 65,000 deaths from tuberculosis in the United States in 1933 to 1934, 5,306 (7 per cent) occurred in tuberculosis departments of general hospitals. In a recent roentgen survey of 4,853 patients admitted at fifteen representative general hospitals, Plunkett and Mikol found 2.6 per cent with pulmonary tuberculosis. This explains some seemingly paradoxical reports of a higher incidence of tuberculosis among nurses in general hospitals than among those at tuberculosis sanatoriums. There is less contact in the former institutions, but that contact is more dangerous because it is not recognized and precautions are not taken. From the study of a few cultures of tubercle bacilli grown from the sterile water used to wash bed sheets, tables, walls and floors of rooms of tuberculous patients the author finds that tubercle bacilli are present in the immediate vicinity of tuberculous patients, and that their number increases with the stage of the disease, the severity of the cough and the lack of precaution taken by the patient. The author states that the change in the status since 1925 has been brought about by roentgenologic studies. The morbidity was probably as high in the twenty-five preceding years but clinically it was not recognized soon enough to be associated with the source of infection. Cutaneous testing has been an even more sensitive gage than the roentgen rays in determining the rate of infection among nurses and students.

New Jersey Medical Society Journal, Trenton

38:159-210 (April) 1941

Treatment of Peptic Ulcer, with Emphasis on Precipitating Factors. J. Gerendasy, Elizabeth.—p. 161.
Syphilis of Thoracic Aorta. J. E. Higi, Newark.—p. 166.
Mental Hygiene and the General Hospital. H. A. Davidson, Newark. —p. 173.
Responsibility of the Physician. E. W. Sprague, Newark.—p. 176.
Management of Infected Tonsils, Teeth and Sinuses in Arthritis. J. W. Gray, Newark.—p. 178.
Trauma Associated with Malignancy. L. J. Levinson and N. J. Furst, Newark.—p. 181.
Respiratory Allergy: Practical Points in Diagnosis and Treatment. J. A. Clarke Jr., Philadelphia.—p. 184.
Functional Disturbances of Gastrointestinal Tract. E. Weiss, Philadelphia.—p. 185.

New Orleans Medical and Surgical Journal

93:491-542 (April) 1941

David French Boyd, a Louisiana Educator. W. D. Postell, New Orleans.—p. 491.
Surgical Treatment of Detachment of Retina. W. R. Buffington, New Orleans.—p. 495.
Hypertension as Symptom of Renal Failure: Review of Recent Literature. R. H. Bayley, New Orleans.—p. 500.
Public Health Administration. W. K. Sharp Jr., New Orleans.—p. 504.
Early Results in Treatment of Cancer of Skin by Method of Chaoul. S. Hatchette, Lake Charles, La.—p. 509.
Studies with Antigens: IX. Treatment with Purified Extracts of House Dust. B. G. Efron, C. H. Boatner and P. Everett, New Orleans. —p. 514.
Sulfanilamide and Sulfapyridine: Pharmacology and Toxicology. E. E. Nelson, New Orleans.—p. 516.
Exfoliative Dermatitis from Sobisminol Mass by Mouth: Case Report. U. S. Hargrove, Baton Rouge, La.—p. 519.
Postparturient Infection with Probable Endocarditis, Pulmonary Infarction, Cerebral Embolism and Bilateral Thrombophlebitis of Internal Saphenous Veins: Report of Case with Recovery. H. T. Engelhardt and O. J. LaBarge, New Orleans.—p. 520.
Spontaneous Mediastinal Emphysema. E. Matthews, New Orleans.—p. 523.
Management of Strychnine Poisoning: Case Report of Recovery Following Ingestion of 0.325 Gm. D. C. Browne and G. McHardy, New Orleans.—p. 525.

New York State Journal of Medicine, New York

41:643-802 (April 1) 1941

Urosurgery in the Young: Pediatrician's Role. M. F. Campbell, New York.—p. 671.
Conservative Surgery in Treatment of Recurrent Salpingitis. H. C. Falk, New York.—p. 675.
Sarcoma of Uterus. F. R. Smith, New York.—p. 681.

41:803-914 (April 15) 1941

Renal Function Tests. D. D. Van Slyke, New York.—p. 825.
Study of Primary Staphylococcic Pneumonias Occurring at the Rochester General Hospital. I. A. Gáspár, Rochester.—p. 834.
Perirenal and Subphrenic Infections. J. H. Powers, Cooperstown.—p. 841.
Eruptions of Pregnancy. M. J. Costello, New York.—p. 849.
Hereditary Lymphedema (Nonne-Milroy-Meige): Report of Family with Hereditary Lymphedema Associated with Ptosis of Eyelid in Several Generations. D. Bloom, New York.—p. 856.
Potency Evaluations of Commercial Female Hormone Preparations. B. L. Cinberg and S. F. Goldman, New York.—p. 864.
Clinical Application of Secretin in Study of Pancreatic Function. J. S. Diamond and S. A. Siegel, New York.—p. 869.
Urinary Tract Injuries During Panhysterectomy. A. J. Wallingford, Albany.—p. 876.
Avitaminosis A: Incidence in Group of 100 Hospitalized Children as Measured by the Biophotometer. H. G. Rapaport and Dorothy Greenberg, New York.—p. 879.
Tumors of Islets of Langerhans with Hyperinsulinism. Virginia Kneeland Frantz, New York.—p. 881.
Contralateral Adrenal Atrophy Associated with Cortical Adrenal Neoplasms. T. Weinberg, Baltimore.—p. 884.

41:915-1026 (May 1) 1941

*Neurosurgical Approach to Epilepsy. J. E. Scarff, New York.—p. 939.
Relation of Kidney to Blood Pressure. H. O. Mosenthal, New York.—p. 953.
Urologic Study of Diabetic Women: Report on Associated Findings of Hypertension. N. Kutzman, E. M. Watson and B. D. Bowen, Buffalo. p. 957.
Tuberculosis in Young Women. R. E. Plunkett and J. Katz, Albany.—p. 961.
Experiences in Thyroid Clinic in a General Hospital. W. C. White, New York.—p. 968.
The Private Physician: Important Link in School Medical Service. J. H. Landes, New York.—p. 973.
Clinical Significance of Bacteremia. C. S. Keefer, Boston.—p. 976.
Ileocolostomy with Exclusion in Treatment of Regional Ileitis. R. Colp and L. Ginzburg, New York.—p. 982.
Physical Examination of School Personnel. E. H. Ormsby, Amsterdam, N. Y.—p. 991.

41:1027-1122 (May 15) 1941

Preparing the Disabled Worker for Reemployment: Role of Physical Therapy in Early Treatment of the Injured Workman. Madge C. L. McGuinness, New York.—p. 1049.
Early Use of Physical Therapy in Treatment of Injury: Its Role in Minimizing the Need for Late Rehabilitation Measures. C. R. Murray, New York.—p. 1052.
Rehabilitation from the Standpoint of the Carrier. M. Butler, Syracuse.—p. 1055.
Rehabilitation and Workmen's Compensation. V. A. Zimmer, Washington, D. C.—p. 1057.
Restoring Work Ability. F. G. Elton, New York.—p. 1060.
Postconcussion Syndrome. M. G. Brown, Syracuse.—p. 1065.
Management of Gross Hemorrhage in Peptic Ulcer: Report of 168 Cases. H. L. Segal, W. J. M. Scott, Rochester, and R. S. Stevens, Chicago.—p. 1074.
Papillary Carcinoma in Horseshoe Kidney: Case. J. S. Fitzgerald, Utica.—p. 1081.
Tumors of Bladder. H. G. Bugbee, New York.—p. 1085.

Neurosurgical Approach to Epilepsy.—Scarff points out that convulsions are no longer regarded as a disease but as a symptom or sign of a number of diseases. A convulsion indicates either a pathologically irritable or irritated brain, and the contributing factors are numerous and diverse. The essential diagnostic problem in any convulsion is to determine whether the disorder is the result of a diffuse pathologic process causing a generally irritable brain or whether it is caused by a focal process. The former is a strictly medical problem, whereas in many instances of the latter only surgical intervention may prove successful. Focal convulsions are indisputable evidence of a discrete, localized, irritative lesion of the brain. The classic example is the so-called jacksonian fit. However, general convulsions do not rule out a focal lesion. They are frequently produced by sharply localized lesions, cerebral tumors for example. All the available sources of focal data should be examined in every case of epilepsy. Various minor and major procedures may aid in determining focalizing features which are not apparent at first. The minor diagnostic considerations include the age of the patient, the type of the early convulsions, whether the attacks are abortive or incomplete, the existence of the aura or warnings, the initiating phase in any given attack, the postconvulsive sequelae or residual symptoms and signs, symptoms or signs referable to the central nervous system associated with the convulsions, active pathologic processes elsewhere in the body, trauma preceding the onset of epilepsy, careful neurologic examination, study of blood chemistry, roentgen examination for depressed fractures or erosions, hyperostoses or vascular anomalies of the bone, electroencephalography and pneumoencephalography. The major diagnostic procedures are craniotomy with visual inspection of the cortex, electrocorticograms and electrical stimulation of the exposed cortex in search of a "trigger area." Diagnosis of "idiopathic epilepsy" is permissible only when (1) the disease first appears during infancy or early childhood and (2) when no evidence of a specific or focalized etiology can be obtained by any of the foregoing methods of study. Even then the diagnosis should be made with mental reservation for, as a result of improved methods and a revival of interest, many cases of epilepsy that would have been regarded as "idiopathic" (and hence incurable) twenty years ago are today being shown to result from a localized, specific lesion for which surgery offers a favorable prognosis. Patients with convulsive disorders should be admitted to a neurologic hospital and the minor and probably major diagnostic procedures applied. At their completion patients can be divided into three categories: (1) Patients with no focal or localizing symptoms or signs are to be treated medically, (2) those with gross anatomic lesions in the brain determined by clinical examination or pneumoencephalography are unquestionably surgical candidates and (3) patients showing evidences of focal lesions which are irritative but not grossly anatomic are to be treated surgically only when all medical measures have failed. Surgery is indicated if the attacks are socially or economically incapacitating, if they are in any way focal, and if medical therapy has failed to control them. Postoperative results (8 illustrative cases) permit certain generalizations: 1. The more definitely and grossly anatomic the focal lesion that causes the convulsion, the more successful, as a rule, is the result following its removal. Patients with depressed fractures and cortical cicatrices which are visible in the pneumoencephalogram have a good chance of complete and permanent cure. Convulsions due to tumors almost completely disappear on the removal of the offending growth. 2. Few patients in whom the focal lesion was essentially physiologic rather than anatomic have been completely cured by operative measures. However, they have shown varying degrees of improvement. The basic cause of convulsions in these patients is probably a constitutionally low threshold for all forms of irritation, and the various focal points found and treated at operation probably represent secondary "release mechanisms."

Ohio State Medical Journal, Columbus

37:305-408 (April) 1941

Medicine in World Crisis. C. A. Doan, Columbus.—p. 321.
Congenital Defects of Femur: Report of Case. H. F. Van Epps and D. H. Downey, Dover.—p. 326.
Use of Diuretics in Treatment of Certain Localized Edemas. M. A. Schnitker, Toledo.—p. 328.
Diagnosis of Early Pulmonary Tuberculosis. S. E. Wolpaw, Cleveland.—p. 338.
Technic for Cholecystectomy. M. E. Blahd, Cleveland, and W. Mendelsohn, New Haven, Conn.—p. 343.
Subacute Bacterial Endocarditis: Case Report. P. C. Colegrove, Oberlin.—p. 346.
Carcinoma of Pituitary Body: Case Record Presenting Clinical Problems. C. D. Aring and R. H. Fuller, Cincinnati.—p. 350.

Physiological Reviews, Baltimore

21:217-382 (April) 1941

Changing Concepts of Chemistry of Muscular Contraction. J. Sacks, Ann Arbor, Mich.—p. 217.
Recent Developments in Histochemistry. I. Gersh, Baltimore.—p. 242.
Intermediary Metabolites and Respiratory Catalysis. K. A. C. Elliott, Philadelphia.—p. 267.
Effect of Anoxia on Alimentary Tract. E. J. Van Liere, Morgantown, W. Va.—p. 307.
Cardiac Automaticity and Response to Blood Pressure Raising Agents During Inhalation Anesthesia. W. J. Meek, Madison, Wis.—p. 324.
Physiology of Itching. S. Rothman, Chicago.—p. 357.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Archives of Disease in Childhood, London

16:1-80 (March) 1941

*Eumydrine in Treatment of Hypertrophic Pyloric Stenosis: Analysis of Forty Consecutive Cases. Helen M. M. Mackay.—p. 1.
Observations on Gastric Acidity During the First Month of Life. R. A. Miller.—p. 22.
Comparison of Breast Feeding in Ten Classes of the Population. Margaret Robinson.—p. 31.
Laboratory Investigation of Pneumonia Among Infants and Children. W. J. Auger, with technical assistance of Isabel Scott.—p. 35.
*Prognosis and Treatment of Acute Diffuse Peritonitis in Children Since Advent of Chemotherapeutic Drugs. K. M. Alford.—p. 43.
Helium-Oxygen Inhalation: Recent Advance in Treatment of Laryngitis and Tracheitis. Genevieve Delfs.—p. 52.
Nephrolithiasis in Children. J. W. Jackson.—p. 55.
Hodgkin's Disease in Children. D. J. M. McCausland.—p. 59.
Icterus Gravis Neonatorum with Erythroblastosis. Helen McKinley.—p. 63.
Development of Vitamin K and Its Clinical Uses in Neonatal Period. H. Savage.—p. 67.

Atropine Methylnitrate for Pyloric Stenosis.—Mackay treated 40 infants with hypertrophic pyloric stenosis with atropine methylnitrate. Projectile vomiting began before the child was 26 days of age; the average at onset was 27 days (youngest 7 days, oldest 68 days). The onset was usually sudden. The average duration of projectile vomiting before treatment was started was fifteen days. Fourteen of the 40 babies had other complications or were extremely feeble on admission. The complications were hematemesis, abdominal distention, pulmonary collapse with infection, pyrexia, boils, symptoms usually attributed to alkalosis, prematurity, cyanotic attacks and convulsions. The babies came from a poor district in the East End of London and treatment at their homes presented difficulties. All but 2 were hospitalized. Atropine methylnitrate solution (1:10,000 in water) was given by mouth usually half an hour, sometimes twenty minutes, before each feeding. The first dose varied from 0.5 to 1 cc. (from 0.05 to 0.1 mg.). This was increased at each feeding by 0.5 cc. until 2 to 3 cc. six times a day was reached, the child receiving from 1.2 to 1.8 mg. of the drug in twenty-four hours. Further increases were made if vomiting was not checked. Of the 40, 5 died during treatment; a sixth died of enteritis and pneumonia, which developed at home four and a half weeks after vomiting had ceased. All vomiting, large or small, of the 31 infants cured with the drug, was said to have ceased within twenty-five days. Excepting for "very small vomits," vomiting was stopped in an average period of ten days. The gain in weight of the babies responding rapidly to treatment was good; for example, in the first week 14 babies gained between 8 and 17 ounces (from 240 to 510 Gm.). Complications other than those existing before treatment was begun developed in some children; diarrhea in 7 (4 of whom died), bronchitis in 4, otitis media in 1, nasal discharge in 1 and pneumonia in a child admitted with a collapsed lung. All these have recovered. Two had hematemesis before treatment was given, and in 2 others it developed in the hospital; 1 of the latter died. Edema developed in 2, in 1 as a result of chilling and in the other presumably from excessive fluid administration. Of the 14 babies suffering from some complication before treatment was started, 9 were cured by atropine methylnitrate, 1 by operation, and 4 died. The biggest cause of mortality in pyloric stenosis treated in the hospital is often infection acquired in the hospital. To this the present series is no exception; of the 5 babies who died, 4 had diarrhea. Sex evidently played no part in the prognosis. Very young babies appear to respond less readily to treatment; however, provided other conditions are favorable, young babies may respond well. It is difficult to say whether or not rapidity and severity of onset influenced the results of treatment. Only in the youngest babies was severity of spasm or vomiting a major factor in determining the outcome. The author feels that a continued high fluid intake often produces poor appetite and diminishes the effectiveness of the drug on the pylorus. Gastric lavage did not appear to have much influence on prognosis. The primary cause of death of 3 of the 5 patients was an infective diarrhea acquired in the hospital, and in 2 a contributory cause was failure to reduce the atropine methylnitrate when abdominal distention was observed, leading in 1 to paralytic ileus. The average duration of treatment for the patients who recovered was fifty-six days. Because of the risks of hospitalization (cross infections) a cooperative mother, who is accurate and methodical, can carry out the treatment at home under supervision. She needs to be instructed in careful measuring and in symptoms of overdosage, and if her supply of breast milk is liberal it may be better, though probably not essential, to teach her to express her milk in order to give the baby at first a measured quantity.

Acute Diffuse Peritonitis and Chemotherapeutic Drugs.—By plotting all the deaths of children from acute diffuse peritonitis since 1935, Alford finds that the mortality rate has decreased appreciably during the last two years. The cases were divided into two groups: (1) primary or idiopathic peritonitis, 67 instances, and (2) secondary peritonitis, 103 cases. Since January 1939 patients have been given large doses of sulfanilamide or sulfapyridine, and peritonitis, whether primary or secondary, has responded to hospital care much more readily. The mortality in 1935 for primary peritonitis was 91.6 and for the secondary type 70 per cent. The respective percentages for the following years were 91.6 and 80 for 1936, 100 and 55 for 1937, 62.5 and 55 for 1938, 9 and 34.7 for 1939 and 0 and 7.6 for 1940. The present treatment for primary peritonitis in children at the Hospital for Sick Children is (1) to obtain peritoneal fluid on admission in order to determine the specific organism; (2) to check the examination of fluid by blood culture, sputum examination (Auger method) and vaginal culture; (3) to put the patient in Fowler's position; (4) light cradle to the abdomen; (5) administration of fluids intravenously (two-thirds dextrose in distilled water plus one-third physiologic solution of sodium chloride to infants and a 5 to 10 per cent solution of dextrose in physiologic solution of sodium chloride to older children); (6) to determine the child's type of blood and to have a donor ready to give transfusion if the hemoglobin or the erythrocytes drop following chemotherapy or if the serum protein falls following continuous intravenous fluid therapy; (7) to give sulfanilamide from 2 to 3 grains (0.13 to 0.2 Gm.) per pound of body weight in twenty-four hours until the concentration in the blood reached 10 mg. per hundred cubic centimeters, for streptococcic infections and then to decrease the dose to from 1 to 1½ grains (0.065 to 0.1 Gm.) per pound of body weight until the temperature remains normal for from two to three days and clinically the child is cured, and (8) to give in twenty-four hours from 1 to 2 grains (0.065 to 0.13 Gm.) of sulfapyridine per pound of body weight for pneumococcic infections; this is continued until the concentration in the blood reaches from 4 to 5 mg. per hundred cubic centimeters and then 1 grain per pound until the temperature remains normal for from two to three days and clinically the child is improved. In addition, from 100,000 to 200,000 units of type specific antipneumococcus rabbit serum is given. The best results obtained in the last year in secondary peritonitis followed combined surgical treatment with the use of the chemotherapeutic drugs. The secondary peritonitis in 79 instances was due to acute appendicitis with perforation. The best treatment for these cases is to diagnose and treat the acute appendicitis before rupture. Chemotherapy, although it will not take the place of any of the indicated surgical measures, has proved a valuable weapon in the armamentarium against appendical peritonitis, as well as a specific for primary streptococcic and pneumococcic peritonitis.

Medical Journal of Australia, Sydney

1:503-536 (April 26) 1941

Workmen's Compensation for Persons Diseased Other Than by Conditions of Their Employment. J. B. Cleland.—p. 506.
Id. S. H. Skipper.—p. 511.
Institutional Experience with Pertussis Vaccine. E. S. Stuckey.—p. 513.
Agranulocytosis Following Use of Sulfapyridine: Report of Case Associated with Abdominal Symptoms. G. N. Morris.—p. 515.

Schweizerische medizinische Wochenschrift, Basel

71:105-124 (Feb. 1) 1941. **Partial Index**

*Clinical Experiences with Transfusion of Conserved Blood. O. Schürch and H. Willenegger.—p. 105.
Significance of Weak Blood Characteristics in Determination of Blood Donors: Case. J. Morawiecki.—p. 110.
Ectomy of Sarcomatous Embolus in Statu Nascendi: Case. R. Meyer-Wildisen.—p. 111.
Administration of Vitamin B_1 by Dielectrolysis. P. Steiner.—p. 112.

Conserved Blood Transfusions.—Schürch and Willenegger base their clinical observations on 160 selected transfusions in which group O donor blood was exclusively used after it had been conserved with sodium citrate and dextrose. Transfusions were made in quantities of 300 cc. Most of the blood was less than two weeks old. About one third derived from the military source had been conserved three to four weeks previously. The older blood showed a hemolytic margin of 0.5 to 3 cc., whereas all blood under two weeks did not exceed 1 cc. The observations made included general condition, temperature, pulse, shock symptoms, blood pressure, blood picture, urinalysis and rechecks of agglutination titer and hemolysis. In the majority of cases an increase in hemoglobin, blood pressure and eosinophile leukocytes was seen. No fatalities occurred. Severest complications consisted in temporary shock and hemoglobinemia and were due to hemolysis and agglutination. These in turn were due to the use of blood of dissimilar blood groups and to the presence of already hemolyzed blood in the transfused blood. No complications are encountered if group O blood with high agglutination titer is transfused slowly and in small quantities. Cachexia constitutes a contraindication. Febrile reactions, amounting to 5 to 10 per cent, generally observed after conserved blood transfusion and representing a higher rate than is seen in fresh blood transfusions, may be due to broken down albumin. Morphologic and biologic investigations show that this disintegration is accelerated as conserved blood ages. The authors believe that conserved blood produces effects similar to those of fresh blood and is superior to saline solutions. Serious reactions can be avoided by careful conservation methods and by testing the blood for hemolysis by sedimentation before use. Elevation of temperature can be further controlled by employing only conserved blood whose age does not exceed two weeks. They recommend that the agglutination titer of group O conserved blood be indicated on the ampules.

Archiv für klinische Chirurgie, Berlin

198:481-674 (April 16) 1940

*Endometriosis. U. Graff.—p. 481.
Histologic Investigations on Surgically Treated Fractures of Neck of Femur: Processes on Bone and Cartilage After Bone Necrosis. F. Felsenreich.—p. 532.
*Malignant Tumors of Thyroid. S. A. Choldin.—p. 579.
Diagnosis of Syphilitic Disorder of Liver and Stomach. A. Vogl.—p. 634.
Osmotic Dehydration in Posttraumatic Increase in Brain Pressure by Hypertonic Solutions with Admixture of Colloid. G. Jorns.—p. 639.
Pathology and Nature of Schlatter's Disease. S. Nagura.—p. 650.

Endometriosis.—According to Graff, symptoms of endometriosis are primarily genital. It is most frequent in women of the premenopausal age. Dysmenorrhea, backache, intermenstrual pain, metrorrhagia, menorrhagia and dyspareunia are frequent complaints. Sterility is comparatively frequent. Pathologic lesions of the genitalia, such as ovarian cysts, uterine myomas, displacements and signs of previous pelvic peritonitic inflammation complete the clinical picture. In the presence of obscure symptoms, diagnosis may be aided by the administration of large doses of progestin, for this will intensify symptoms caused by endometriosis. In the endometriosis of the rectocervical septum, vesical, rectal or vaginal symptoms may predominate. Rectal symptoms are probably the most frequent: there is pressure, or a foreign body sensation in the rectum, and bowel evacuation is more difficult. Increasing stenosis of the rectum dominates the clinical picture. Examination reveals hard masses between the uterus and the rectum, more rarely single hard nodules. The rectum itself may contain nodular masses which may create the impression of a tumor, cause hemorrhages and suggest carcinoma. Dense masses of tissue may fill the pelvis or may surround and compress the ureters. Changes in the intestinal and stenotic symptoms, the changing rectoscopic appearances, the fact that rectal mucosa remains intact and that infiltration is chiefly in the rectocervical space together with scarcity of bleeding speak against carcinoma and for endometriosis. Rectal endometriosis may be combined with endometriosis of the colon, particularly of the sigmoid flexure. These cases are characterized by increasing constipation with attacks of ileus at the time of menstruation and colics and pain in the left hypogastric region. Diagnosis is difficult when the ileus is total and roentgen examination may fail completely. Simultaneous existence of chocolate cysts of the left ovary, myomas of the uterus and extensive adhesions in the culdesac of Douglas indicate endometriosis. The author discusses endometriosis of other segments of the colon, of the small intestine, of the inguinal region, of the umbilicus and in cicatrices. The genesis of endometriosis is not completely understood. Sampson's implantation theory has many adherents and seems well founded, except for the demonstration of the possibility of implantation of the cast off mucosa. The seroepithelial theory maintains that formation of endometriosis is traceable to cells of the coelomic epithelium. The author feels that even though this theory explains the majority of endometrioses it is based on a number of presumptions which have not been proved. Endometriosis of the intestine which does not cause symptoms may be left alone. Resection is recommended for endometriosis of the small intestine with symptoms of total or partial ileus. In colon endometriosis, ileus must first be treated. In the absence of ileus and in the presence of partial stenosis and a favorable general condition, resection of the involved intestine is advisable. Bowel resection with preservation of genital functions is capable of accomplishing a cure without the danger of a relapse. Resection is comparatively simple in stenosing endometriosis of the sigmoid flexure but difficult in endometriosis of the rectocervical space. Here it is rarely possible to remove the infiltrating masses without mutilating interventions on the genitalia and the rectum. It has been demonstrated, however, that incomplete removal of the masses may effect a cure, although there is danger of recurrence, if the ovarian function is preserved. Irradiation of the ovaries or of the endometriosis may effect a cure without complete disappearance of the induration, but irradiation may also increase the rectal stenosis. Resection of the rectum with primary suture has produced good results with a small surgical mortality.

Malignant Tumors of Thyroid.—Choldin reports observations on 142 thyroid tumors seen at the Oncologic Institute in Leningrad. Of these 59 were malignant. This is not an indication of the incidence of malignancy but rather of the nature of the institute, whose function is to treat malignant tumors. Reports from literature cited by the author indicate that malignant tumors of the thyroid amount to only 1 or 2 per cent or less of the total number of thyroid tumors. Women predominate in both types, but the predominance is much more pronounced for the benign type, in which the ratio is 6:1, whereas in the malignant type it is 2:1. Benign goiters of women develop chiefly at the time of the menarche and the menopause. Every hyperplasia of the thyroid may develop into a neoplasm. Adenoma of the thyroid may become malignant in the course of its development by direct transformation into a malignant tumor with changes in the biomorphologic nature or by transmission of its elements by way of the blood or lymph vessels, without visible change in the basic structure ("hemophilic metastasizing adenomas"). The growth of neoplasms of the thyroid is analogous to that of the mammary gland. Here too the developmental chain has at one end a functional hyperplasia, which for a while is reversible (mazoplasia) but which later is transformed into irreversible proliferations (fibroadenomatosis cystica); and at the other there are the true benign and malignant neoplasms. "Metastasizing" adenomas and metastases of thyroid tissue can be spoken of only in cases in which the adenomatous structure of the tumor and of the metastases is proved or in which by constant observation or at necropsy a thyroid tumor has been ruled out. Microscopic demonstration of the proliferation of adenomatous elements into blood vessels identifies the tumor as potentially malignant. The constancy of infiltration of epithelial elements into blood vessels in the "metastasizing adenomas" makes it possible to designate them as hemophilic "adenomas." Their structural similarity

to the benign and their potential capacity for the formation of distant metastases excludes them from the benign as well as from the malignant growths and identifies them as a transitional form. The papillary strumas develop slowly and offer best permanent results after treatment. Among the carcinomas, adenocarcinomas with preservation of the adenomatous structure show the least, while the diffuse forms show the greatest malignancy. The less differentiated the cellular elements, the more malignant is the course. Microscopic diagnosis calls for examination of different sections of the tumor. The clinical course of malignant strumas is characterized by three groups of symptoms: (1) those which accompany changes in the thyroid itself, in its size, consistency and mobility; (2) symptoms produced by impairment of the function of neighboring organs (respiration, swallowing and speech); (3) symptoms indicative of disturbances in the entire organism or of certain systems, (endocrine disturbances, metastases, cachexia). Metastases are frequent in the malignant tumors of the thyroid, 28 of the 59 patients exhibiting metastases at the time of admission to the institute. The papillary goiters cause metastases chiefly by way of the lymphatic system; the cancerous growths metastasize with equal frequency through the lymph and through the vascular systems. Malignant goiter is not hopeless. About 40 per cent of patients treated at the institute survived for more than three or five years, and more than a fourth were well at the end of these periods. The best permanent results are obtained with surgery or with surgery plus irradiation. The success of treatment is largely dependent on the stage of the disease. The earlier the treatment, the longer the survival. In men results were highly unfavorable, only 2 of 17 having survived, whereas of 34 women 16 survived, and of these 10 are well. The author thinks that this is due to the fact that in women malignant tumors are mostly of the type which pursues a more favorable course. The operative mortality is comparatively high and is generally due to postoperative hemorrhage, laryngeal edema and pneumonia. It is especially high when tracheotomy is performed.

Medizinische Welt, Berlin

14:1241-1268 (Dec. 7) 1940. **Partial Index**

*Intestinal Tuberculosis and Its Treatment. H. Alexander.—p. 1241.
Sinking and Prolapse of Female Genitalia. W. Schaeffer.—p. 1243.
Effects on Foot of Wearing Wooden Shoes. A. Basler.—p. 1246.
Simple Method of Avoiding Disadvantages of Delay in Boiling in Nylander Sugar Test. P. Dassau.—p. 1249.

Intestinal Tuberculosis.—Alexander maintains that, while primary intestinal tuberculosis is rare, secondary intestinal tuberculosis is one of the most frequent complications of pulmonary tuberculosis and its existence always implies a more serious prognosis. Early diagnosis is difficult because there is not a single symptom which definitely demonstrates its presence. The critical evaluation of the entire clinical picture is therefore the more important. Roentgenologic examination is of great help. The fully developed clinical picture is characterized by irregular hectic fever, poor appetite, progressive emaciation, unfavorable blood picture with severe deviation to the left, high sedimentation speed, and dyspepsia in which characteristic pains appear from one half to one hour after ingestion of food. The treatment of intestinal tuberculosis cannot be schematic. The diet especially must be adjusted to the individual case. Repeated examinations of the stools will indicate the degree of irritation and the admixture of mucus. The utilization of the different foodstuffs with the aid of Schmidt's test meal is helpful because it reveals abnormal processes of fermentation. If diarrhea predominates, a bland diet, like that employed in enterocolitis, is advisable. If there is considerable putrefaction, meat and eggs should be restricted; when fermentation is present, the carbohydrates must be limited. Roughage in the food should be avoided even if constipation is the outstanding symptom. Evacuation of the bowel must be effected by enemas, liquid petrolatum or the eating of cooked fruit before bedtime. If the diet is deficient in vitamins, medication with vitamins is necessary. Other medicaments cannot be entirely dispensed with, but they should be as mild as possible and given in the smallest effective doses. The author mentions animal charcoal, kaolin, tannin preparations, bismuth salts and calcium preparations. Opiates should not be resorted to as long as possible, but as the intestinal tuberculosis progresses they will become necessary. Application of warmth is advisable. Tuberculin and irradiation offer little promise of success. Pneumoperitoneum often exerts a favorable effect, which however is only temporary. Isolated cecal tuberculosis is an entity per se because here surgical treatment or roentgen irradiation is effective. Since intestinal tuberculosis develops as a rule because infected sputum is being swallowed, patients with pulmonary tuberculosis must be taught the importance of careful expectoration. This and the suitable treatment of gastric and intestinal disturbances are important prophylactic factors.

Tokyo Igakkwai Zassi, Tokyo

55:109-188 (Feb.) 1941. **Partial Index**

*Trachoma Studies with Special Reference to the Prowazek Bodies. Y. Mitui and K. Asida.—p. 183.

Prowazek Bodies in Trachoma.—Mitui and Asida report the results of examinations of 156 patients suffering from trachoma among the inhabitants of Sinojima, a small island in the Pacific. The population of the island is about 2,800 and the greater percentage of inhabitants are engaged in fishing. Four distinct stages are recognized: (1) acute trachoma characterized by fresh granular lesions, (2) early chronic trachoma with little evidence of scar formation, (3) intermediate chronic trachoma with a moderate amount of scar formation but no evidence of complications and (4) late chronic trachoma with pannus formation and distortion of the eyelashes in addition to definite presence of scar tissue. Eye smears were made from corneal scrapings and stained by the Giemsa technic. The positive cases were identified by the presence of Prowazek bodies, not free in the extracellular space but embedded in the phagocytic cells. These inclusion bodies were found in 88 out of 105 (83.8 per cent) cases of trachoma. The positive Prowazek bodies indicate the severity of the disease, being present alike in acute and chronic stages. The difficulty in demonstrating the inclusion bodies in chronic cases of trachoma does not constitute valid evidence for denying the etiologic role these bodies may play in the pathogenesis of the disease. A few statistical studies included in this investigation indicate the degree of likelihood of transmission of the disease during infancy and childhood and point out that the hygienic and sanitary conditions of the bone, as well as of the persons in it, are definite factors in the control of the disease. In many instances evidence was obtained of spontaneous cure of the disease, and the rate of such cure appears to be in direct proportion to the duration of the disease.

Acta Chirurgica Scandinavica, Stockholm

84:283-382 (Feb. 8) 1941

Regenerative Capacity of Epithelium of Tunica Interna After Vascular Suture. L. Efskind.—p. 283.
*Postoperative Complications with Thrombosis and Embolism: Their Frequency, Time of Appearance and Duration of Hospital Stay After Operation. S. Linde.—p. 310.
Pulmonary Embolism on the Operating Table: Three Cases. G. Pettersson.—p. 321.
Treatment of Tuberculous Cervical Lymphoma: Late Results in Two Hundred and Thirty Cases Treated Partly Surgically, Partly Roentgenologically. H. B. Wulff.—p. 343.
Isolated Dislocation of Ulnar Nerve with Report of One Case. E. Schildt.—p. 367.

Postoperative Thrombosis.—Linde calculated the incidence and mortality rate of postoperative thrombosis, including embolism, and the prolonged hospitalization necessitated by it, on the basis of case histories sifted out from the records of 11,400 operations performed in two Swedish hospitals during 1934-1939. Eighty-seven per cent of the patients presented an age level above 30 years. Thrombosis occurred in 259 cases, an average of 2.3 per cent. A higher census was observed for cholecystectomy (3.7 per cent), varicotomy (3.5 per cent), appendectomy with drainage (3.3 per cent, without drainage 1.8 per cent), mammary carcinectomy (2.7 per cent) and nephrectomy (2.7 per cent). There were 41 deaths from thrombosis (11.3 per cent) out of a total mortality of 362, respresenting a 15.8 per cent death rate for blood clot involvements. Thrombosis set in, on the average, on the tenth day after surgical intervention. Prolonged hospitalization due to thrombosis or embolism amounted to thirty-eight days. The symptoms accompanying thrombosis formation are listed by the author. The study throws light on the therapeutic value of heparin in postoperative cases.

Book Notices

Air Raid Precautions. In Ten Parts. Reprinted by Permission of the Controller of His Britannic Majesty's Stationery Office. First American edition. Cloth. Price, $3. Various pagination, with illustrations. Brooklyn: Chemical Publishing Company, Inc., 1941.

This is the first American edition of this work, published in England. It consists of ten parts, describing the work of rescue parties, decontamination services, air raid wardens' service, structural defense, report of air raid damage, notes on training and exercise, gas detection, protection of windows, repair of respirators, and the care and custody of equipment. It is an official document issued by persons who have had the responsibility of caring for the population under air raid conditions. In the preparation of our own nation for civilian defense, this book will be invaluable.

Thirty-Fifth Annual Report, 1939-40, The Carnegie Foundation for the Advancement of Teaching. Paper. Pp. 170. New York, [n. d.].

"Society demands that the school shall be in its image."—*Anatole de Monzie.* With this quotation President Jessup opens the first chapter of his report. After a few observations respecting the educational ends and means revealed over the past decade or more in statements by nationals of Germany, France and Britain, he proceeds to examine a few phases of the American educational program in the light shed by the programs of these other nations. Despite the economic pressure of recent years, "reports indicate . . . that there are in the United States . . . more than 1,300,000 college students." Evidently, says President Jessup, "with the sanction of equality of opportunity which these figures imply, many colleges have accepted students who were incompetent, have given scholarships they could not afford to give, have made loans that they could not collect. The unfortunate results of such policies are so obvious, however, that we may expect that they will be discontinued."

Attention is called to the fact that many colleges are already wondering about the possible danger perhaps inherent in the common American practice of working one's way through college and to President Conant's vigorous action to secure funds "to enable students of capacity to be freed from the necessity of spending long hours in menial work that cannot help but have serious consequences upon their physical health and that may well seriously affect their personalities." Another section deals with the adjustment of the foundation's resources so as to meet its obligation for teachers' retiring allowances. For the successful solution of this difficult problem, the foundation and the Carnegie Corporation deserve high praise. Fittingly, a tribute is paid to the memory and the services of the late President Pritchett, the creator, and for so many years the director, of the foundation.

Part II of the report is designated "Educational Enquiry" and deals largely with a project initiated a few years ago concerned with the construction, maintenance and use of a set of examinations for the purpose of sampling a student's organized knowledge in various fields with a view to determining his fitness for admission to graduate school. As originally constructed, the examination included seven tests to be completed by the student in six hours—two half-day sessions. The fields covered were (1) mathematics, (2) physical sciences, (3) biologic sciences, (4) social studies, (5) literature and the fine arts, (6) a foreign language and (7) verbal factor. All students took the same tests, and the scores of each were recorded on a chart based on the average scores of a standard group of men, recently graduated from college, who were taking graduate work for the first time. Likewise the average scores in each test of students majoring in each important field were so indicated on the chart that each student could compare his own score with those of others in the same group. Primarily, therefore, the examination operates in the interest of the student, especially of the student who is consciously in the business of educating himself. He can neither pass nor fail, but by its means he can learn where his greatest available knowledge lies, how it compares with that of his potential competitors, where his resources are weak or lacking, and at what points they might well be extended. This should of course closely concern any institution that is interested in confirming intellectual growth, in ensuring a student's fitness for his studies and in estimating his consequent dividend in effective education. Another chapter deals with "learning and forgetting."

Part III deals with the administration of the foundation, including the customary report on gifts and allowances.

The fourth section consists of brief biographic notes concerning those members of the teaching profession under the retirement provisions of the foundation who have died during the preceding year. Included in this volume is also the report of the treasurer.

The Etiology of Child Behavior Difficulties, Juvenile Delinquency and Adult Criminality with Special Reference to Their Occurrence in Twins. By Aaron J. Rosanoff, M.D., Leva M. Handy, M.A., and Isabel Rosanoff Plesset, B.A. State of California Department of Institutions Psychiatric Monographs No. 1. Published for the Department of Institutions. Paper. Price, $1. Pp. 187. Sacramento: California State Printing Office, George H. Moore, State Printer, 1941.

In this monograph the authors have attempted a study of the etiology of behavior disorders and adult criminality in twins. They collected the records of 409 pairs of twins. In this series there was some mental or behavior difficulty of one or both of the twins in each pair. The material for study was obtained from child guidance clinics, school clinics, neurologic clinics and special classes for problem children in the public schools. The cases of juvenile delinquency, i. e. delinquent boys or girls under 18 years of age, were collected from juvenile courts, especially those that were placed on probation or committed to correctional institutions. Persons 18 years of age or over who were convicted and sentenced by a criminal court to a city or county jail or to a state or federal prison or were granted probation constitute the remainder of the material.

In order that the cause of any physical or mental disorder may be properly classified, it is important that the twins be correctly diagnosed as to type—whether they are monozygotic, identical or one egg twins or dizygotic, fraternal or two egg twins. In a tabulated study of the material the authors note that among the monozygotic or identical twins, as would be expected, behavior disorders, delinquency and criminality seemed relatively more common in males than in females—and, as might be anticipated, the two individuals tended to react uniformly as to criminal tendencies. Twins of the same sex, though dizygotic in origin, show less concordance in criminality or behavior disorders. The same was found true of twins of opposite sex, though even among these a certain proportion of mental abnormality occurred in both of the twins. These differences between the one egg and the two egg twins may be readily explained by the fact that any twin of dizygotic origin may be said to have the same characteristics as any other sibling in the same family. Newman believes that dizygotic twinning is not twinning at all.

The text of this volume considers detailed case histories of male and female monozygotic twins, male dizygotic twins, female dizygotic twins and twins of opposite sex. Ever since the days of Sir Francis Galton, attempts have been made to ascertain whether the mentality of twins was due to nature or to nurture. The present authors believe that, while hereditary factors may play a part in the etiology of behavior disorders, these factors alone are not sufficient to explain the mental difficulties. They would support this view by referring to their results, which show that 13.1 per cent of the monozygotic twins gave discordant manifestations. Furthermore, they believe that hereditary factors are discounted by the fact of the high incidence of concordance among the fraternal or dizygotic twins, as compared with the corresponding results among singly born siblings. In short, the authors are not convinced from their case studies that heredity is the preponderating cause of mental deviations in twins. On the other hand, detailed analysis of their material leads the authors to think that cerebral birth trauma is a factor of the highest importance in the etiology of child behavior difficulties, juvenile delinquency and adult criminality. In this connection they state their belief that hereditary factors which may play a part in the etiology of antisocial behavior produce their effect by determining an undue vulnerability of the brain tissues, thus greatly increasing the hazard of cerebral birth trauma. The authors point out an interesting

observation, namely that delinquency and criminality are more frequent in the male offspring. This was best brought out by a consideration of the twins of opposite sex, particularly in a study of adult criminality, with 154.5 per cent of relative excess of males affected.

Johannes Lange, who made investigations and published a monograph on the same subject, was led to believe from his studies that heredity seemed to be an important etiologic factor. He cited cases in which identical twins, even when living in distant localities and under different environments, tended to resort to similar crimes about the same period of life. Lange also found that in dizygotic twins one or both might present symptoms of criminality and deliquency, though it should be pointed out that criminality among siblings occurs in many families, generation after generation. Lange believed, as a result of his studies, that environmental influences may produce delinquency and criminality. He thought that periods of poverty and financial distress tend to increase crimes against property. He also pointed out that attacks of encephalitis in infancy or early childhood may cause disorders of behavior or even criminality.

There are some other factors to be considered in the etiology of mental disturbances of one kind or another in twins. They are likely to be feeble and premature at birth, and as a result they may suffer from spontaneous cerebral hemorrhages. Or they may suffer from difficulties in delivery, leading to cerebral trauma. In some instances, one is led to believe that disturbances of nutrition or blood supply to the fetus may lead to physical or mental maldevelopment. Frequently one observes in dizygotic twins that one is born robust, and the other is small and weak and hardly viable; perhaps the latter twin occupied an unfavorable position in the uterus and suffered from a deficient blood supply.

The etiology of child behavior difficulties, juvenile delinquency and adult criminality among twins does not permit of ready or easy solution. Twin births are not of extremely rare occurrence, about one in one hundred. Many are and remain normal, physically and mentally, and a comparatively small proportion show mental defects. It would seem that in order to make a more complete appraisal of the cause of mental aberrations in twins, information should be collected concerning the health and nutrition of the mother during pregnancy, and a detailed record of the labor, as well as careful clinical observations of the feeding and health of the babies during the first days and years of life. The facts are that, even after one reads this excellent monograph, the conclusion that cerebral trauma should be considered the principal cause of behavior disorders, delinquency and criminality in twins lacks convincing proof.

A Textbook of Dietetics. By L. S. P. Davidson, B.A., M.D., F.R.C.P., Professor of Medicine and Clinical Medicine in the University of Edinburgh, Edinburgh, and Ian A. Anderson, M.B., Ch.B., Clinical Tutor and Assistant in the Metabolic Wards, the Royal Infirmary, Aberdeen. With Diet Sheets Constructed by Miss Mary E. Thomson, S.R.N., Sister Dietician to the Royal Infirmary. And a foreword by Sir John Boyd Orr, M.D., D.Sc., LL.D., Director, Rowett Institute for Research in Animal Nutrition, Aberdeen. Cloth. Price, $4.25. Pp. 324. New York: Paul B. Hoeber, Inc., 1941.

In Great Britain as in the United States, nutrition is to the fore. Few physicians endeavor to keep abreast with the mass of dietetics, yet diet has come to occupy so intimate a place in both the causation and treatment of various disorders that the modern physician must realize that a sound knowledge of nutrition is fundamental to a high quality of medical care. Much of the illness which afflicts human populations is directly attributable to dietary deficiencies. Moreover, the general resistance to all types of disease is also influenced by such factors. In this volume the authors have analyzed the general dietary considerations and then present the present status of knowledge in Great Britain on special factors related to specific diseases. In a considerable number of tables and in a large appendix they provide recommendations for the use of the diet in special diseases and also many facts of general importance. The volume is, of course, written in British English; and, while it compares favorably with a number of American textbooks, there are others which are far superior.

Modifikatsiya operatsii Razumovskogo na yaichke; eksperimentalnoe issledovanie. [By] G. I. Pinchuk. S. predisloviem i pod redaktsiey B. Z. Gutnikova. [Modification of Razumovskiy Operation on Testicles; Experimental Study.] Paper. Price, 3 rubles; 50 kopecks. Pp. 62, with 25 illustrations. Rostov on Don: Rostovskoe Oblastnoe Knigoizdatelstvo, 1939.

This monograph, in Russian, presents experimental work on dogs and horses in which the epididymis was resected and the vas deferens was implanted into the rete halleri of the testis. The author concludes that ligation of the vas deferens, when followed by obliteration of the vas, leads in some instances to atrophy of the testis. Resection of the epididymis and ligation of the vas lead to dystrophy and atrophy of the testis. The author modified Razumovskiy's operation of anastomosis between the vas and the testis by fenestrating that part of the vas which is implanted into the bed of the testis with the view of creating temporary drainage. Preservation of the deferential artery is essential for success. By creating a temporary fistula of the vas, the author was able to ascertain the patency of the transplanted duct. This brief monograph should prove of interest to urologists, particularly because of an interesting review of the literature on the subject.

Where Angels Dared to Tread. By V. F. Calverton. Cloth. Price, $3. Pp. 381. Indianapolis & New York: Bobbs-Merrill Company, 1941.

In the United States have developed most of the peculiar mind healing, utopian and peculiar cults known to the world. In the United States, because of our particular organizational ability, many of these cults have achieved their greatest development. V. F. Calverton made a careful study of some of the most notable ones, including the Rappites, Oneida County, Zion City and Father Divine. The index provides the names of innumerable others which are casually mentioned, but the dozen or more which were carefully studied are typical of all. In an epilogue Calverton points out that these communities had the advanced conception of a cooperative society but were ancient in their religious perspectives. Most of these colonies have peculiar rules of belief, peculiar rules of diet, peculiar rules in regard to sex. Thus they concentrated on the chief interests of mankind and thus they achieved their followers. Calverton concludes that man can achieve a cooperative commonwealth in our indiustrial society but he cannot do it in terms of an agrarian or theocratic utopia.

Textbook of Medicine. By Various Authors. Edited by J. J. Conybeare, M.C., D.M., F.R.C.P., Physician to Guy's Hospital, London. Fifth edition. Cloth. Price, $7.50. Pp. 1131, with 55 illustrations. Baltimore: William Wood & Company, 1940.

Five editions of this well known British textbook of medicine have appeared in eleven years. This edition has eighteen contributors, many of them well known in this country. The book suffers in places from excessive brevity and illustrates in others the rapid advance in medicine which makes it almost impossible for a textbook to be strictly up to date. Thus sulfanilamide is listed as one of the treatments for pneumococcic pneumonia; doubtless it is rarely used in Britain or this country any more for that purpose. There is a section on psychologic medicine and another on common diseases of the skin. Possibly it is necessary to include such sections in a textbook on medicine, but it might be more desirable to omit them and give more complete discussions of other diseases. In spite of the war, this book will doubtless continue to hold its high place in the regard of medical students and many practitioners.

Food, Teeth and Larceny. By Charles A. Levinson, D.M.D. Cloth. Price, $3. Pp. 232. New York: Greenberg, Publisher, 1940.

This is a relatively voluminous discussion of a special variety of the fake accident racket, namely injury to the teeth and mouth from foreign bodies in food, in which dentists as well as physicians may be involved, innocently or otherwise. It includes descriptions of numerous typical alleged accidents, of adequate and unsatisfactory professional examinations and of court proceedings in cases that came to trial, concluding with recommendations for the management and handling of such accidents, both real and alleged. It will serve as a useful reference work for all concerned with this type of accident, whether physician, dentist, lawyer, food handler or layman.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

OLD POLIOMYELITIS AND BASAL METABOLISM

To the Editor:—I am interested in obtaining some information on the interpretation of basal metabolic tests, in particular of a white man who complained of lassitude, coldness and a feeling of inadequacy, especially physical. The physical examination showed hypotension, subnormal temperature, bradycardia and other signs which might readily be interpreted as the result of hypothyroidism, vagotonia or a lowered tonus from previous spinal cord injury. The most significant fact in the history and examination was an attack of acute anterior poliomyelitis in his youth, involving many muscle groups and resulting in crippling and the necessity of wearing several heavy braces. If the present fatigability is due to the carrying of these heavy braces, why has this man had plenty of energy and felt well for the thirty or forty years between his acute paralysis and the present? A basal metabolic test was made with a + 3 result. The weight of the braces was obtained by the patient before leaving for the test and was subtracted from his total weight in obtaining the proper figure for the calculation incidental to the basal metabolic test. Clinically the patient showed a remarkable improvement following the administration of even small doses of strychnine, belladonna and thyroid. The rationale of the treatment was to reduce the vagotonia (belladonna), increase the metabolic rate (thyroid) and increase the activity of the spinal cord tonus (strychnine). I am especially interested in obtaining the following information: 1. Does acute anterior poliomyelitis affect not only the anterior horn cells of the gray matter of the spinal cord but also the cells involved in maintaining tonus, e. g. blood pressure? 2. Is the autonomic nervous system affected? 3. In a case in which there is atrophy of many muscle groups, what special considerations are there in obtaining and interpreting a basal metabolic test? 4. Ordinarily basal metabolic tests are compared with standards obtained through many thousands of examinations of supposedly normal persons. In what way would the old infantile paralysis victim be different from these so-called normal persons?

Braham H. Golden, M.D., New York.

ANSWER.—1. There is no evidence that acute anterior poliomyelitis affects permanently any other than the anterior horn cells of the spinal cord. In the acute stage it is well recognized that the whole of the spinal cord is involved in the infectious process, including the meninges.

2. During the acute stage the autonomic nervous system is affected, but after the initial stage of the disease the permanent defects are only in the anterior horn cells.

3. In obtaining and interpreting basal metabolic tests no special considerations are necessary with patients who have marked muscular atrophy.

4. Patients with old poliomyelitis would not be considered different from normal persons as far as basal metabolism goes, provided due care was used in making the test.

OVERHEATING AND SUNSTROKE

To the Editor:—What is the specific pathologic difference between "overheating" and "sunstroke"? Are they simply gradations of the same process? Does the actinic ray enter into the picture at all? If so, how?

M.D., California.

ANSWER.—"Overheating" and "sunstroke" both are the result of heat retention in the body. When the environmental temperature reaches or exceeds body temperature, body heat cannot be lost by radiation. If the environmental air is saturated with moisture, body heat cannot be lost by evaporation and the body temperature begins to rise. This heat retention often results in symptoms of dizziness, ataxia, dyspnea and weakness. It may go on to peripheral vascular collapse and syncope. This is known as "overheating" or heat exhaustion. It is often complicated by loss of chloride due to excessive sweating. In this condition the cerebral heat regulating mechanism is undisturbed but heat loss is impossible because of environment. The body temperature rises but a few degrees. Indeed, the mouth temperature may be subnormal because of the peripheral vascular collapse.

"Sunstroke" is the term applied to the heat retention due to a loss of heat control. The skin is hot and dry as in high fever and the body temperature rises to from 106 to 110 F. The heat regulating mechanism does not readily respond and the temperature may remain high for several days. "Sunstroke" may come on primarily or it may be a further development of "overheating."

Thus, "overheating" is due to physical obstacles, to heat loss from the body while "sunstroke" is due to a disturbance of heat regulation. Both are associated with heat retention. It is not likely that the actinic ray is involved in the picture because "sunstroke" or hyperpyrexia may result from exposure to high temperature and dry environmental conditions where there is no exposure to the sun at all. The prognosis in "overheating" is good, while in "sunstroke" the prognosis is much more grave.

SULFANILYLGUANIDINE

To the Editor:—Some difficulty has been experienced here in obtaining detailed information concerning the drug sulfanilylguanidine. I should be grateful for any information.

M.D., Hong Kong, China.

ANSWER.—Sulfanilylguanidine (sulfaguanidine) is the guanidine analogue of sulfapyridine and sulfathiazole. This drug is fairly water soluble, is poorly absorbed from the intestinal tract and is experimentally active against various bacteria. These properties allow the attainment of a high concentration of drug in the intestine with a low concentration in the blood and body tissues—a situation somewhat analogous to the use of sulfonamide drugs as urinary antiseptics. Determinations of the concentrations of sulfanilylguanidine in the blood and in the stools show that in patients saturation of the intestinal contents with the drug can be obtained with a dosage schedule which gives a low concentration of the drug in the blood, thus confirming deductions made from experimental observations on animals. Information available to date indicates that this drug is effective in the treatment of acute bacillary dysentery and possibly also in chronic cases. In other intestinal infections, sufficient data are not available to assess its value. The drug is being tried out as a prophylactic in operations on the colon.

The dosage schedule recommended is as follows: 0.1 Gm. per kilogram orally as an initial dose and then 0.05 Gm. per kilogram orally every four hours, day and night, until the number of stools drop to five or less daily; then 0.05 Gm. per kilogram every eight hours for at least seventy-two hours.

Few toxic effects have been observed in the treatment of patients with sulfanilylguanidine. These have been of the same nature as those observed with other sulfonamide drugs.

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PROBABLE NEUROCIRCULATORY ASTHENIA

To the Editor:—A game warden aged 37 gives a history of attacks of palpitation, nervousness, sweating, pallor and inability to talk in the presence of strangers or when he has to talk before an audience or testify before a jury in the line of his work. Lately the attacks have become more severe, with a moderate amount of pain in the heart of an anginal nature. It has become bad enough now so that he hesitates to make an arrest or attend a convention or testify at a trial. He has had two or three attacks of pain in the abdomen, which have had some features of appendicitis; but the blood count was not high enough to merit surgical intervention. These attacks had no relation to the other attacks, which were brought on by excitement. Physically his examination shows few positive manifestations. His pulse rate was a little rapid on the first examination, but even the examination almost brought on an attack. The sedimentation rate, white blood cell count, hemoglobin, Wassermann test, blood pressure and temperature were all within normal limits. My impression was that he was suffering from a functional heart or so-called soldier's heart, but my problem is how to treat the condition. Will he have to change his work, and, if so, what work would you recommend?

M.D., California.

ANSWER.—From the facts given this appears to be an example of "the irritable heart of soldiers," better called "neurocirculatory asthenia." If angina pectoris due to coronary artery disease can be excluded—an electrocardiogram and roentgen examination would be helpful for this purpose—the case should be regarded as one of anxiety neurosis. Any latent source of infection should be sought for and, if found, should be removed.

There is no known specific treatment. The functional nature of the condition should be promptly explained to the patient. Temporarily he should be relieved of undue responsibility. He may be encouraged to engage in moderate physical exercise such as fishing, golf, bicycling and ping pong, but not to the point of exhaustion. Psychotherapy is useful in the hands of a trained person who will give him sufficient time. Drugs, other than sedatives for poor sleep or laxatives for constipation, are without permanent value. Amphetamine sulfate is useful for the symptoms of depression and fatigue but should be avoided in coronary artery disease; its administration should be confined to the morning and early afternoon hours to avoid insomnia. For the present a vacation from work may be advisable. If a change of work is absolutely necessary, routine occupation with little responsibility and no unusual strain is indicated. If possible it is advisable to avoid a definite resignation of his present work as game warden, as this might involve him in new difficulties. The duration of such conditions is difficult to estimate.

PSORIASIS

To the Editor:—A woman aged 31 has had psoriasis since she was about 6 years of age. From the age of 13 until about two years ago a strong ultraviolet ray treatment, given once a week, would control the condition fairly well. Within the past two years, and especially within the past ten months, the condition has become definitely worse. With the exception of her face, the psoriasis is covering her entire body. On several portions of her body, especially the axillas, groins and the lower part of the back, the patches are now coalescing, and in places which did not previously itch the itching has become intense. This patient is high strung, and to give her any rest whatever at night she must have 3 to 9 grains (0.2 to 0.6 Gm.) of sodium amytal, and on rare occasions ½ grain (0.03 Gm.), of morphine has been needed to obtain any effect. About a year ago the patient was placed in a local institution and the following treatment instituted: At night the entire body was covered with crude coal tar, and this was left on all night. In the morning a bath and then a rub with liquid petrolatum were given, followed by one to two hours of close, intense ultraviolet irradiation. After about two weeks of this treatment, the entire body was clear. There was no sign of psoriasis present. The patient was discharged and went back again to one to two hours of ultraviolet treatment a week. Within two months the lesions reappeared as before. Several months later she was again placed in an institution, and the same regimen was followed with the exception that this time the technician who gave her the ultraviolet irradiation wiped off the liquid petrolatum before administering the rays. At the end of three weeks the lesions were better but had not cleared up as much as the first time. Incidentally, about a year ago this patient weighed 186 pounds (84.4 Kg.). She was advised to reduce, and the psoriasis improved up to a certain point—that is until the patient reached 140 pounds (63.5 Kg.). However, she insisted on reducing further, against advice, down to 114 pounds (51.7 Kg.). As she has reduced from 140 to 114 pounds, her psoriasis has definitely become much worse. She realized her error and tried to regain some of her weight. She now weighs 124 pounds (56 Kg.). Recently I read of the use of injections of bismuth preparations and have started them. She has so far had four injections of a bismuth compound without any noticeable results. Is there any new therapy known for the treatment of this condition? Would you suggest readmission to the institution? The patient could be 2 inches away from the source of the ultraviolet rays, take an hour's treatment and not show any effect of a burn. I myself, using the same lamp, held my arm under it for two minutes at the same distance and received an intense erythema. I am beginning to wonder whether or not the ultraviolet rays, which previously helped the patient, are not now having just the opposite effect on the psoriasis.

M.D., New York.

ANSWER.—Severe itching in psoriasis vulgaris is not a common sign. It does, however, occur in acute psoriasis or in psoriasis irritated by local applications or exposures to intense ultraviolet rays. Pruritus is almost always more acute in a neurotic person, and the statement that the patient is "high strung" makes this last premise an important one to consider. Ormsby (Diseases of the Skin, Philadelphia, Lea & Febiger, 1934, p. 264) cited Polotebnoff (in Unna, P. G.: Dermatologische Studien, Leipzig, Leopold Voss, 1891, vol. 12, p. 347) as being a strong supporter of the nervous origin of psoriasis: "He believes that psoriasis is one of the multiple symptoms of a vasomotor neurosis in which the disturbances in the circulation occur just as they do in various organs of the body, sometimes extending to the skin." The neuropathic hypothesis has had many supporters (Weyl and others, including Besiner, Polotebnoff, Bourdillon and Kuznitsky (*Arch. f. Dermat. u. Syph.* **38**:405, 1897). After the external causes of irritation that might contribute to the acuity of the eruption and cause severe itching have been ruled out, the possibility that sodium amytal, which the patient has been receiving in large doses for some time, is causing a toxic erythema which is masked by the psoriasis and which could well cause severe itching must be considered. The ability of the barbital compounds to produce exfoliative dermatitis (Sexton, D. L.; Pike, G. M., and Nielson, A.: Exfoliative Dermatitis and Death Due to Phenobarbital, THE JOURNAL, Feb. 22, 1941, p. 700) must be considered, and a threatened exfoliative dermatitis in any case of acute psoriasis is always possible. A complete examination of the blood should be done to determine whether any abnormality in leukocytes exists that may presage a lymphoblastoma. (See footnote, page 16 in special article on psoriasis by Fred Wise and M. B. Sulzberger, Year Book of Dermatology and Syphilology, Chicago, Year Book Publishers, Inc., 1940.) Psoriasis is a capricious disease showing remissions and exacerbations, and Pernet has stated that those cases showing remissions in the summer frequently show a great improvement after exposures to ultraviolet rays. The treatment with crude coal tar (Goeckerman, W. H., and O'Leary, P. A.: Erythroderma Psoriaticum: Review of Twenty-Two Cases, THE JOURNAL, Dec. 17, 1932, p. 2102) is effective in many cases of psoriasis and, like all treatment, must be persisted in when recurrences take place. In this treatment "the patient is anointed with a 2 per cent ointment of crude coal tar before retiring at night. In the morning the ointment is removed with olive oil, leaving a thin film on the affected areas, and the body is then exposed to gradually increasing doses of ultraviolet light. In the interval between treatment a bland ointment, such as boric acid salve or petrolatum, should be applied. Caution must be used to avoid excessive exposure to ultraviolet, especially during the first weeks of treatment." Entrance into an institution or hospitalization in psoriasis is a matter of choice, depending on the patient's ability mentally and physically to carry out treatment as outlined by the physician in charge. The comment that "she was advised to reduce and the psoriasis was better" is interesting in the light of the work of Grütz, who, as a result of investigation on lipoid metabolism in psoriasis, found excessive amounts of cholesterol and phosphatides and expressed the belief that psoriasis was caused by a disturbance of the metabolism of fats and obtained good results with diets low in fats or a fat free regimen. Madden (Treatment of Psoriasis, THE JOURNAL, Aug. 24, 1940, p. 588) expressed the belief that the low fat diet is of value in most cases of psoriasis. When the patient was reducing, she no doubt limited the ingestion of fats among other things in her diet, and it is probable that for this reason her psoriasis improved during this period. The value of therapy with bismuth compounds in true psoriasis is questionable. The newest therapy reported in psoriasis is the use of lipocaic (Stewart, C. D.; Clark, D. E.; Dragstedt, L. R., and Becker, S. W.: *J. Invest. Dermat.* **2**:219 [Aug.] 1939), which produces a reduction of blood lipids and "lends support to the idea that the psoriasis is associated with a deranged fat metabolism." Lipocaic, however, is not yet available for general use. Psoriasis is variable in its response to treatment, and its exact genesis is unknown. Like many conditions in medicine, cutaneous or visceral, rest in bed and freedom from the ordinary conflicts in life have a beneficial influence as an adjunct in any scheme of therapy, and as stated previously the matter of readmission of a patient to an institution is a question of fine judgment on the part of the attending physician, who knows all the facts and factors surrounding the patient. Variations in a person's response to exposure to ultraviolet rays are dependent on the texture and pigmentation of the skin, since there exists an inherent difference of reaction to sunlight in different persons. It is conceivable that a type of treatment such as ultraviolet irradiation which is helpful at first reaches a status quo without further beneficial response on the part of the patient.

STREPTOCOCCI IN STOOLS

To the Editor:—I shall appreciate your opinion concerning the following questions: Can Streptococcus viridans or a haemolyticus be found by culture from the stools of normal persons? If so, in what percentage of individuals? If either strain of streptococcus can be recovered from a stool, how often is it of pathologic significance? Is there any evidence of therapeutic value of a vaccine made from either strain of streptococcus which is recovered by culture of a stool?

M.D., District of Columbia.

ANSWER.—Streptococcus viridans is commonly found in stools. The origin of these organisms in the stools may be the throat, where they are present in abundance. Streptococcus haemolyticus in the stools may also represent organisms in the nasopharynx. Hare and Maxted (The Classification of Hemolytic Streptococci from the Stools of Normal Pregnant Women and of Cases of Scarlet Fever by Means of Precipitin and Biochemical Tests, *J. Path. & Bact.* **51**:513 [Nov.] 1935) examined a series of 50 stools in consecutive cases of scarlet fever and found potentially infective strains in the feces of about 20 per cent of cases in which there was a hemolytic streptococcus infection of the nasopharynx. They examined 100 stools from normal parturient women in the first stage of delivery and found 29 to contain streptococci giving beta hemolysis on blood

agar. Human pathogenic group A strains were not encountered in this group as was the case in the stools from the patients with scarlet fever. There is no convincing evidence of the therapeutic use of a vaccine made from stool cultures of either Streptococcus viridans or Streptococcus haemolyticus.

OBESITY AND THYROID ADMINISTRATION

To the Editor:—A married woman aged 36, after a hysterectomy with bilateral salpingo-oophorectomy eleven years ago, gradually increased in weight from 135 pounds (61 Kg.) to 290 pounds (131 Kg.). To reduce she tried dieting, injections of estrogenic substance, injections of anterior pituitary and amphetamine sulfate by mouth—all to no avail. Four grains (0.25 Gm.) of thyroid daily started three and one-half months ago, brought her weight down 20 pounds (9 Kg.), but this had to be discontinued because of the development of a sensation of pressure under the right sternoclavicular articulation followed in a week or two by the appearance of a frequent hacking cough and slight difficulty in breathing. The basal metabolic rate was 0, and the pulse rate, which has always been between 85 and 95, showed no change. The blood pressure averages 165 systolic and 110 systolic. The patient is now receiving injections of a preparation containing adrenal cortex extract, pituitary, ovary and thyroid but is gradually gaining weight. She insists that thyroid medication be resumed. Do you agree that her cough was probably caused by a substernal enlargement of the thyroid gland? How often does this occur during a course of thyroid therapy? Is there any possibility of continuing thyroid medication? Would the use of iodine be of any help? What else might be tried to reduce her weight?

M.D., Massachusetts.

ANSWER.—There is no evidence whatever presented in this communication for the presence of a substernal goiter. It would be impossible to say what the cause of the patient's cough is without more information. One would be particularly interested in knowing something about the condition of the patient's heart. Thyroid medication might be continued if the patient was carefully followed and the dose carefully regulated, but there are, of course, some patients who cannot tolerate thyroid in even small doses.

There are three ways of reducing: (1) by dieting, (2) by exercise and (3) by drugs. The best and most important method is dieting. The other two are only supplementary. The administration of a preparation containing adrenal cortex extract, pituitary, ovary and thyroid represents shotgun therapy. The only active ingredient of such a preparation is the thyroid which it contains.

The use of iodine does not seem indicated.

A patient like this should be placed on a well balanced diet of about 1,500 calories, supplemented, if possible, by a dose of about 2 grains (0.12 Gm.) of U. S. P. thyroid daily and by the administration of enough estrogenic material to control any menopausal symptoms from which she may be suffering.

TESTICULAR ATROPHY AFTER HERNIOTOMY—HERNIOTOMY AND GONORRHEA

To the Editor:—We operated on a man aged 31 in November 1939 for a recurrent inguinal hernia. This hernia had been originally operated on in 1930 elsewhere. The patient's general condition before operation was good. He gave a history of having had gonorrhea several times. At the time of operation there was a considerable amount of scar tissue about the cord. The spermatic cord was found to be small. There was a small hernial mass extending through the internal ring. This hernial sac was tightly adherent to the cord. This was dissected from the cord with great difficulty, and the canal was then reconstructed by transplanting all the fascia beneath the cord. His convalescence was a bit stormy in that on the second postoperative day he had an elevation of temperature and a swelling of the right part of the scrotum with pain and tenderness of the right testis. The operative wound was not infected. The diagnosis at that time was right epididymitis, vasitis and orchitis. This gradually decreased in severity. The patient was discharged from the hospital in two weeks' time. He was kept under observation for a period of six weeks and then was allowed to return to work. When he was last seen, in February 1940, there was atrophy of the right testis, but the patient complained of no pain and there was no recurrence of the hernia. I would like comment on the frequency of testicular atrophy following operation for hernia, the relationship of the reactivation of gonorrhea following operation for inguinal hernia and the relationship and effect of gonorrhea on sterility and potency. I would appreciate any comments and bibliography regarding these points.

M.D., California.

ANSWER.—The explanation of the sequelae in this case rests almost with certainty on the difficulty of the dissection of the cord from the sac. As the spermatic cord was small it is not unlikely that it was somewhat damaged in the first operation and that, as a result of the first operation, dense adhesions formed to the second sac. The dissection of this cord from the sac was a difficult matter and no doubt impoverished the vascular supply, which was already poor to start with. The postoperative swelling of the right testis, the pain and even the elevation of temperature would fit with a stasis of blood or thrombosis. Heuer and Andrus (Nelson New Loose-Leaf Surgery, New York, Thomas Nelson & Sons, 1937, vol. 4, p. 638) say: "A primary swelling of the testis, epididymo-orchitis, was followed by atrophy of the testis in 5 to 10 per cent of instances." No figures are at hand as to the instances of atrophy of the testis after operations for inguinal hernia, but Claverley (*Lancet* **1**:277, 1917) has written a paper entitled the Association of Atrophy of the Testicle and Inguinal Hernia. This paper was cited by Watson (Hernia, ed. 2, St. Louis, C. V. Mosby Company, 1938, p. 206). It pointed out that traumatism to the cord is sometimes followed by thrombosis, which is the usual cause of orchitis and epididymitis when they follow operations for hernia. It is almost impossible that the gonorrhea was reactivated by the operation for hernia. Young and Davis (Practice of Urology, Philadelphia, W. B. Saunders Company, 1926, vol. 1, p. 214) said "Acute epididymitis, both gonococcal and that due to other organisms, is rarely accompanied by pronounced orchitis." Young added that "acute orchitis is comparatively rare except in those cases associated with mumps."

Potency should in no way be affected by gonorrhea. Hinman (Urology, Philadelphia, W. B. Saunders Company, 1935, p. 832) said that "sterility may be due to strictures involving the vas deferens and to prostatoseminal vesiculitis as well as to other causes." Sterility and impairment of potency would be extremely unlikely in a case of this kind.

CONSTANT BLOOD SUGAR BEFORE AND AFTER DEXTROSE ADMINISTRATION

To the Editor:—I recently performed a series of ten blood sugar tests on a patient with diabetes. I performed a test during fasting, with dextrose, following intake of carbohydrate, and hourly tests thorughout the day. The blood sugar invariably was 100 mg., and there were various percentages of sugar in the urine. A check of my apparatus showed the chemicals to be in good condition. What do you think of these results?

M.D., New York.

ANSWER.—Did all the specimens of urine contain sugar? If they did and the blood sugar analyses are accurate, then the patient has renal glycosuria and not diabetes mellitus.

It is suggested that the blood sugar technic be tested by doing your own blood sugar and that of a person known to have diabetes both fasting and at one hour after a meal.

DO RADIO TECHNICIANS HAVE MORE GIRL CHILDREN?

To the Editor:—May the use of high frequency current have some effect on sex determination where the fathers have been continuously exposed by working around such currents? This particular question was asked me recently by one of my patients, and I replied in the negative. My patient then informed me that a survey of certain New York radio stations showed that there was a great predominance of girl babies in the families of technicians at these stations. I am incredulous of this whole matter but would appreciate an opinion.

M.D., Virginia.

ANSWER.—As far as is known there are no statistical data on this point. It is difficult to conceive how high frequency currents can affect the male gonads in such a way as to destroy or inhibit the capabilities of the potential female-producing spermatogonia and them only. One wonders whether the persons who conducted the survey in radio stations made certain to limit their study to a consideration of the children born to the technicians after they began their work in the radio stations. Likewise it is important to know whether a large enough number of men were studied to make the survey statistically reliable.

KERATITIS AND MALARIA

To the Editor:—In The Journal of May 10, 1941, there is a question concerning malaria as a cause of an inflammation of the eye. It is probable that the patient in question had a dendritic corneal ulcer, now known to be caused by a herpetic virus but formerly thought to be due to malaria. Duane in his translation of Fuchs stated that "dendritic keratitis was first described by Kipp, who pointed out that in America at least it is caused in nine cases out of ten by malaria. In Europe it is said to have the same cause as herpes febrilis. Fuchs said that "cases like those occurring in America which are due to malaria are relieved by quinine." Since that time practically all textbooks of ophthalmology except the most recent ones have given malaria as a cause of dendritic keratitis. Atkinson (External Diseases of the Eye, 1934) gave malarial keratitis as a secondary diagnosis for dendritic keratitis and cited Duane. Foster Moore, in Berens' "The Eye and Its Diseases" stated that dendritic ulcers are usually a sequel of a febrile attack and seem to be especially common in malaria. Duke Elder stated that perforation of the cornea is extremely rare and mentioned a report of a case by Lebin in 1933 which coincided with a case of malaria. Duke Elder listed the condition under the heading of herpetic keratitis. Probably the confusion arose from the prevalence of malaria, a chronic febrile disease, and vitamin deficient diets in the Southern states, both of which would tend to make the population susceptible to invasion by a herpetic virus.

G. E. Berner, M.D., Philadelphia.